

36. The Cichlid Fishes of Lake Nyassa. By C. TATE REGAN, M.A., F.R.S., F.Z.S., Keeper of Zoology, British Museum (Natural History).

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(Plates I.-VI.\*; Text-figures 1-30.)

The Fishes of Nyassa have been somewhat neglected in comparison with those of Tanganyika and Victoria. They were first described by Günther (P. Z. S. 1864) from specimens collected by Sir John Kirk, and nearly thirty years had passed before the same author again described fishes from the lake sent by Sir Harry Johnston (P. Z. S. 1893). Later a collection made by Captain E. L. Rhoades was described by Boulenger (Ann. & Mag. N. H. (8) ii. 1908). In Boulenger's 'Catalogue of African Fresh-water Fishes,' iii. (1915), 38 species of Cichlidæ are recorded from Nyassa; one of these, *Petrochromis nyassæ*, may now be removed from the list. The supposed occurrence of the specialized Tanganyika genus *Petrochromis* in Nyassa was difficult to explain; re-examination of the type of *P. nyassæ* leads me to regard it as identical with the more recently described *P. fusciolatus*, and I have no doubt that the locality assigned to it was an error on the part of the collector. The loss of this species from the Nyassa list is made good by the re-establishment of Günther's *Chromis subocularis*, placed by Boulenger in the synonymy of *C. johnstoni*, so that the number of valid species of Cichlidæ hitherto described from Nyassa is 38.

The present revision is based on an examination of the specimens in the collection of the British Museum (Natural History), including the types of all the species described by Günther and by Boulenger, but principally on the study of a very fine collection made and presented to the Museum by Mr. Rodney C. Wood. As a result, the number of species is more than doubled, 46 being described below as new to science. Of the 84 species all but 5 (3 *Tilapia*, 1 *Astatotilapia*, 1 *Serranochromis*) are endemic, and the proportion of endemic genera is high, 11 out of 15, but more than half the species belong to the widely distributed genus *Haplochromis*. The majority of the Nyassa genera are quite distinct from any found elsewhere: for example, *Rhamphochromis*, which may be supposed to occupy the same place in Nyassa that *Bathybates* does in Tanganyika, is very different from *Bathybates*. There are, however, a few remarkable examples of convergent evolution in Nyassa and Tanganyika†. The fish described below as *Pseudotropheus tropheops* bears a great superficial resemblance to *Tropheus*, and has the same peculiar dentition; another new type, *Aulonocara*, has deep channels with large openings in the frontal, nasal, orbital, præopercular, and mandibular bones, exactly as in *Trematocara*.

\* For explanation of the Plates see p. 727.

† For the Tanganyika genera see Regan, Ann. & Mag. N. H. (9) v. 1920, p. 33.

*Synopsis of the Genera.*

- I. Scales cycloid or very finely denticulate.
- A. Pharyngeal apophysis formed by parasphenoid only.
- Teeth in narrow or moderately broad bands, outer bicuspid, inner tricuspid ..... 1. *Tilapia*.
- Teeth very small, in very broad bands ..... 2. *Corematodus*.
- Teeth in a few series, slender, with expanded crowns, the outer obliquely truncated ..... 3. *Hemtilapia*.
- B. Pharyngeal apophysis formed by parasphenoid in middle and preotics at sides.
- Teeth moderate, outer mostly bicuspid, inner tricuspid ..... 4. *Otopharynx*.
- Teeth very stout, unicuspid ..... 5. *Chilotilapia*.
- II. Scales usually distinctly denticulate. Pharyngeal apophysis formed by parasphenoid in middle and basioccipital at sides.
- A. Bones of head with small muciferous canals with small pores.
1. Præmaxillaries without anterior beak-like expansion.
- a. Edge of membrane of spinous dorsal produced into lappets.
- a. Teeth conical, or outer bicuspid and inner tricuspid.
- Teeth of outer series in upper jaw first decreasing and then increasing in size antero-posteriorly; band of teeth in lower jaw crescentic ..... 6. *Astatotilapia*.
- Upper jaw with a rather broad band of small cuspidate teeth anteriorly and a series of enlarged conical teeth on each side; lower jaw with a band of teeth with incurved lateral edges, from which a single series runs back on each side ..... 7. *Pseudotropheus*.
- Teeth conical; lower jaw with 4 anterior canines ..... 8. *Cynotilapia*.
- Teeth conical; no canines; 7 to 9 series of scales on cheek. Outer teeth decreasing in size posteriorly; no distinct canines; bands of teeth continuous; 2 to 6 series of scales on cheek ..... 9. *Serranochromis*.
- Teeth very small and slender, forming narrow bands which are interrupted at the symphyses ..... 10. *Haplochromis*.
- β. Outer teeth very broad, compressed, with or without a pair of small lateral cusps ..... 11. *Lethrinops*.
- b. Edge of membrane of spinous dorsal running evenly between the tips of the spines ..... 12. *Docimodus*.
2. Præmaxillaries with an anterior beak-like expansion. ..... 13. *Cyrtocara*.
- ..... 14. *Rhamphochromis*.
- B. Frontals, nasals, orbitals, præopercular and mandibular bones deeply excavated, with large openings ..... 15. *Aulonocara*.

1. *TILAPIA* A. Smith, 1840  
(type *T. sparmanni* A. Smith).

Teeth small or moderate, in several series, the outer bicuspid, the inner tricuspid (sometimes conical in large fish). Scales cycloid or feebly denticulate. Pharyngeal apophysis formed by parasphenoid only.

Africa; numerous species.

The four species found in Nyassa may be distinguished as follows:—

I. Three anal spines.

A. Caudal scaled only at the base.

- Maxillary extending to below eye ..... 1. *mossambica*.
- Maxillary not extending to below eye ..... 2. *melanopleura*.

B. Caudal covered with small scales ..... 3. *squamipinnis*.

II. Four anal spines ..... 4. *shirana*.

1. *TILAPIA MOSSAMBICA* Peters, 1852.

Bouleng. Cat. Afr. Fish. iii. p. 154, fig. 101.  
East Africa.

2. *TILAPIA MELANOPLEURA* A Dum., 1859.

Bouleng. Cat. Afr. Fish. iii. p. 190, fig. 123.  
West Africa, Congo, and Zambesi.

3. *TILAPIA SQUAMIPINNIS* Günth., 1864.

Bouleng. Cat. Afr. Fish. iii. p. 183, fig. 118.  
Nyassa.

4. *TILAPIA SHIRANA* Bouleng., 1896.

Bouleng. Cat. Afr. Fish. iii. p. 151, fig. 98.  
Nyassa and Portuguese E. Africa.

2. *COREMATODUS* Bouleng., 1896.

Jaws with very broad bands of very small teeth, the outer with expanded, compressed, and obliquely truncated crowns, the inner mostly pointed. Scales cycloid.

A single species from Nyassa.

*COREMATODUS SHIRANUS* Bouleng., 1896.

*Corematodus shiranus* Bouleng. Cat. Afr. Fish. iii. p. 494, fig. 342.

Depth of body  $2\frac{2}{3}$  in length, length of head 3. Snout with convex profile, shorter than postorbital part of head. Diameter of eye equal to præorbital depth, 5 in length of head: interorbital width  $2\frac{3}{4}$ . Jaws equal anteriorly; maxillary extending to below eye. 4 series of scales on cheek. 12 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 34 scales in a longitudinal series. Dorsal XVI 11; last spine  $\frac{2}{3}$  length of head. Anal III 9: third spine  $\frac{1}{3}$  length of head. Caudal scaly. Caudal peduncle  $1\frac{1}{2}$  as long as deep. Body with seven narrow blackish cross-bars as in *Tilapia squamipinnis*, the first downwards from origin of dorsal, the last two on caudal peduncle.

The type, 200 mm. long.

3. *HEMITILAPIA* Bouleng., 1902.

Teeth in 3 to 6 series, small, with slender shaft and compressed and expanded crown, those of outer series obliquely truncated. Scales feebly denticulate.

A single species from Nyassa.

*HEMITILAPIA OXYRHYNCHUS* Bouleng., 1902.

*Hemitilapia oxyrhynchus* Bouleng. Cat. Afr. Fish. iii. p. 489, fig. 339.

Depth of body  $2\frac{2}{5}$  to  $2\frac{2}{3}$  in the length, length of head 3 to  $3\frac{1}{3}$ . Snout with straight or concave profile, from as long as to  $1\frac{3}{4}$  diameter of eye, which is  $3\frac{1}{4}$  to  $5\frac{1}{2}$  in length of head, in adult equal to preorbital depth; interorbital width  $3\frac{1}{2}$  to 4 in head. Jaws equal; maxillary not extending to below eye. 3 or 4 series of scales on cheek. 12 or 13 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 33 to 35 scales in a longitudinal series, 5 or 6 from origin of dorsal to lateral line. Dorsal XVI 10-11; last spine from less than  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Anal III 9-10; third spine from less than  $\frac{1}{3}$  to more than  $\frac{2}{5}$  head. Pectoral as long as or a little shorter than head. Caudal scaly, truncate or slightly emarginate. Caudal peduncle longer than deep. A dark spot on operculum, usually two on lateral line below spinous and soft dorsal respectively and another at base of caudal. Dorsal and caudal spotted with orange; anal with long spots between the rays; males with dorsal, anal, and pelvic fins darker, pale-edged.

Seven specimens, 90 to 190 mm. long. (Moore, Rhoades, Wood).

#### 4. OTOPHARYNX Regan, 1920

(type *Tilapia auromarginata* Bouleng.).

As *Tilapia*, but the prootic forms part of the facet for articulation of the upper pharyngeal on each side.

Nyassa; two species.

#### 1. OTOPHARYNX AUROMARGINATUS Bouleng., 1908.

*Tilapia auromarginata* Bouleng. Cat. Afr. Fish. iii. p. 180, fig. 115.

Depth of body  $2\frac{1}{2}$  to  $2\frac{2}{3}$  in length, length of head  $3\frac{1}{3}$  to  $3\frac{1}{2}$ . Snout decurved, as long as or a little shorter than postorbital part of head. Diameter of eye equal to depth of preorbital,  $3\frac{3}{4}$  to 4 in length of head; interorbital width 3 to  $3\frac{1}{3}$ . Jaws equal anteriorly; maxillary not extending to below eye; teeth in 3 to 5 series, inner tricuspid or conical; 60 to 75 in outer series of upper jaw, the anterior bicuspid, the posterior conical. 4 series of scales on cheek. 15 to 18 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. Scales cycloid, 33 or 34 in a longitudinal series, 5 or 6 from origin of dorsal to lateral line. Dorsal XVII-XVIII 10-11; last spine  $\frac{2}{5}$  length of head or a little more. Anal III 9-10; third spine stronger than dorsals,  $\frac{1}{3}$  head or a little more. Pectoral as long as head, not reaching anal. Caudal densely scaled, emarginate. Caudal peduncle  $1\frac{1}{4}$  as long as deep. Bluish; dorsal and anal dark blue with yellow edge; dorsal with series of red spots.

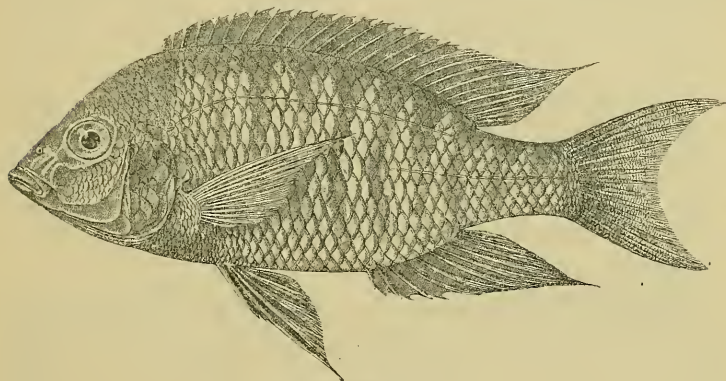
Two specimens, 205 and 240 mm. in length, and a skeleton.



2. *OTOPHARYNX SELENURUS*, sp. n. (Text-fig. 1.)

Depth of body  $2\frac{1}{2}$  in length, length of head  $3\frac{1}{3}$ . Snout with straight profile, as long as postorbital part of head. Diameter of eye nearly equal to depth of preorbital or cheek, 4 to  $4\frac{1}{2}$  in length of head, interorbital width 4. Jaws equal anteriorly; maxillary not extending to below eye; teeth in 3 or 4 series, 50 to 55 bicuspid teeth in outer series of upper jaw. 3 or 4 series of scales on cheek. 12 gill-rakers on lower part of anterior arch. 35 scales in a longitudinal series, 6 from origin of dorsal to lateral line. Dorsal XVI-XVII 11-12; last spine  $\frac{2}{5}$  length of head, longest soft rays nearly as long as head. Anal III 9; third spine stronger and shorter than last dorsal. Pectoral as long as head, reaching anal. Caudal scaly, deeply emarginate. Caudal peduncle  $1\frac{1}{2}$  as long as deep. Bluish grey, uniform or with traces of darker cross-bars.

Text-figure 1.

*Otopharynx selenurus*.  $\frac{1}{2}$ .

Two specimens, 135 and 155 mm. in total length (Wood).

A smaller example, 90 mm. long, is more slender (depth 3 in length), but, except for juvenile characters, such as the larger eye ( $3\frac{1}{3}$  in head), is very similar to the two described; colour silvery, with traces of several cross-bars; an oblong dark spot on lateral line below middle of spinous dorsal, a band along lower lateral line.

5. *CHILOTILAPIA* Bouleng., 1908.

Jaws with an outer series of stout, little compressed, teeth, and 3 or 4 inner series of smaller subconical teeth, which are stronger at the sides of the premaxillaries than in front. Scales cycloid or feebly denticulate.

Nyassa; a single species.

## CHILOTILAPIA RHOADESII Bouleng., 1908.

*Chilotilapia rhoadesii* Bouleng. Cat. Afr. Fish. iii. p. 499, fig. 366.

Depth of body  $2\frac{1}{3}$  to  $2\frac{2}{3}$  in the length, length of head  $3\frac{1}{2}$ . Snout short, declivous; diameter of eye 4 to  $4\frac{1}{2}$  in length of head, præorbital depth 4, interorbital width 3. Jaws equal anteriorly; mouth wide, with short lateral cleft. 3 or 4 series of scales on cheek. 11 gill-rakers on lower part of anterior arch. Middle pharyngeal teeth moderately strong, subconical. 32 to 34 scales in a longitudinal series. Dorsal XV–XVI 10; last spine  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Anal III 9–10. Pectoral a little longer than head, reaching anal. Caudal densely scaled, emarginate. Caudal peduncle a little longer than deep. Silvery or bluish; an opercular spot; sometimes a broad dark band on each side of back and another on middle of side; soft dorsal with series of spots.

The type (220 mm.) and two specimens of 180 and 200 mm. (Wood).

6. ASTATOTILAPIA Pellegr., 1904  
(type *Labrus desfontainesii* Lacep.).

Near *Haplochromis*, but posterior teeth of outer series of upper jaw increasing in size backwards. Teeth in 3 to 5 series, cuspidate or conical, those of outer series of upper jaw sometimes bicuspid anteriorly, conical posteriorly; band of teeth in lower jaw crescentic. Middle teeth of lower pharyngeal somewhat enlarged. Dorsal XIII–XVII 8–11. Anal III 7–11. Scales 26 to 36.

Africa.

This genus includes three species placed by Boulenger in *Tilapia*, namely, *T. symnertoni*, *T. burtoni*, and *T. calliptera*, and four included by him in *Haplochromis*, *H. strigigena*, *H. moffati*, *H. desfontainesii*, and *H. moeruensis*. These are all closely related, agreeing in the form and size of the mouth, the rather short pectorals, comparatively short caudal peduncle (as long as deep), and the rounded caudal.

ASTATOTILAPIA CALLIPTERA Günth., 1893.

*Tilapia calliptera* Bouleng. Cat. Afr. Fish. iii. p. 222, fig. 145.

Depth of body  $2\frac{1}{2}$  to  $2\frac{2}{3}$  in length, length of head  $2\frac{3}{4}$  to  $3\frac{1}{2}$ . Snout with straight profile, shorter than postorbital part of head. Diameter of eye  $3\frac{1}{2}$  to  $4\frac{1}{2}$  in length of head, in adult scarcely greater than depth of præorbital; interorbital width  $3\frac{1}{2}$  to  $4\frac{1}{3}$  in length of head. Jaws equal anteriorly; maxillary extending to below anterior edge of eye; teeth in 3 to 5 series, 40 to 60 in outer series of upper jaw, the anterior bicuspid, the last 2 or 3 (young) or 8 or 9 (adult), conical, increasing in size posteriorly. 3 to 5 series of scales on cheek. 8 to 10 gill-rakers on lower part

of anterior arch. Middle pharyngeal teeth rather strong, conical in adult. 29 to 33 scales in a longitudinal series, 5 or 6 from origin of dorsal to lateral line. Dorsal XIV-XVI 8-11; last spine  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Anal III 7-9; third spine stronger and usually shorter than last dorsal. Pectoral shorter than head, not reaching anal. Caudal rounded. Caudal peduncle as long as deep. An opercular spot and a dark bar from eye to end of maxillary; body with or without dark cross-bars and a dark lateral band; dorsal and caudal sometimes spotted; males with lower fins blackish, the anal with 2 to 6 rounded orange spots.

Nyassa and Zambezi.

Numerous specimens, 65 to 140 mm. in total length.

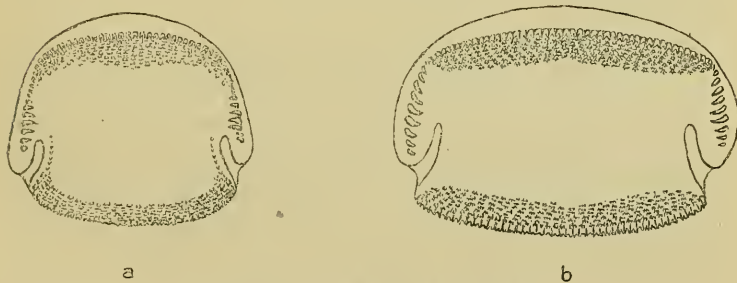
#### 7. PSEUDOTROPHEUS, gen. n.

(type *Chromis williamsi* Günth.).

Jaws with several series of teeth anteriorly, the outer bicuspid, the inner small and tricuspid, forming rather broad curved or transverse bands; upper jaw with a series of conical teeth on each side posteriorly, more or less sharply differentiated, some or all larger than the last bicuspid teeth; lower jaw short and broad, with the lateral margin of the band of teeth incurved, and with a series of teeth on each side behind the band. Dorsal XVI-XIX 8-10. Anal III 7-9. Scales denticulate.

Nyassa; five species.

Text-figure 2.



a. Dentition of *Pseudotropheus tropheops*.  
b. „ „ *Tropheus moorii*.

#### Synopsis of Species.

##### I. Jaws equal anteriorly.

- |   |                       |
|---|-----------------------|
| D. XVI-XVII 9. A. III 8. 4 series of scales on cheek.....   | 1. <i>williamsi</i> . |
| D. XVIII 9. A. III 9. 5 or 6 series of scales on cheek..... | 2. <i>zebra</i> .     |

##### II. Lower jaw shorter than upper; mouth rounded.

- |  |                            |
|--|----------------------------|
| D. XVIII 9. A. III 8. Depth 3 in length .....            | 3. <i>novemfasciatus</i> . |
| D. XIX 8. A. III 7. Depth $3\frac{2}{3}$ in length ..... | 4. <i>auratus</i> .        |

##### III. Mouth subterminal, transverse; snout very convex.

- |                            |                       |
|----------------------------|-----------------------|
| D. XVII 10. A. III 8 ..... | 5. <i>tropheops</i> . |
|----------------------------|-----------------------|

1. *PSEUDOTROPHEUS WILLIAMSII* Günth., 1893.

*Chronis williamsii* Günth. P. Z. S. 1893, p. 624, pl. lvi. fig. C.

*Tilapia livingstonii* Bouleng. P. Z. S. 1899, p. 134, pl. x. fig. 2;  
Cat. Afr. Fish. iii. p. 243, fig. 162.

*Tilapia williamsii* Bouleng. Cat. Afr. Fish. iii. p. 225, fig. 147.

Depth of body equal to length of head, 3 in length of fish. Upper profile of head convex; snout as long as or a little longer than diameter of eye, which is  $3\frac{1}{2}$  to 4 in length of head, nearly equal to or greater than the interorbital width, depth of cheek, or præorbital. Mouth terminal, rounded; maxillary extending to below anterior edge of eye; teeth in 5 or 6 series, inner small, tricuspid: 40 to 52 teeth in outer series of upper jaw, the last 3 or 4 (young) or 6 to 9 (adult) on each side conical, enlarged and sharply differentiated from the rest, which are bicuspid. 4 series of scales on cheek. 9 or 10 gill-rakers on lower part of anterior arch. Pharyngeal teeth small, slender. 33 scales in a longitudinal series, 6 from origin of dorsal to lateral line. Dorsal XVI-XVII 9; last spine a little less than  $\frac{1}{2}$  length of head. Anal III 8; third spine a little shorter than dorsal. Pectoral  $\frac{3}{4}$  length of head, not reaching anal. Caudal truncate?, densely scaled in basal half. Caudal peduncle as long as or a little longer than deep. Body with 6 dark cross-bars, or bars represented by a series of spots above lateral line and another on middle of side; an opercular spot and a dark bar or spot on base of caudal; two round white (? orange) spots on anal fin (probably absent in ♀).

Two specimens, types of the species and of *T. livingstonii*, 105 and 75 mm. long.

2. *PSEUDOTROPHEUS ZEBRA* Bouleng., 1899.

*Tilapia zebra* Bouleng. Cat. Afr. Fish. iii. p. 244, fig. 163 (1915).

Depth of body  $2\frac{1}{2}$  in length, length of head  $3\frac{1}{5}$ . Snout decurved, a little longer than diameter of eye, which is 4 in length of head, a little greater than depth of præorbital, equal to depth of cheek; interorbital width 3 in length of head. Mouth terminal, rounded, rather wide; jaws equal anteriorly; maxillary extending to vertical from anterior edge of eye; teeth in 4 or 5 series, 56 in outer series of upper jaw, the last 8 or 9 conical. 5 or 6 series of scales on cheek. 12 gill-rakers on lower part of anterior arch. 31 scales in a longitudinal series, 8 from origin of dorsal to lateral line. Dorsal XVIII 9; last spine nearly  $\frac{1}{2}$  length of head. Anal III 9; third spine a little shorter than last dorsal. Pectoral nearly as long as head, not reaching anal. Caudal probably truncate, densely scaled at base. Caudal peduncle a little deeper than long. A dark bar between eyes, a second from opercular spot to occiput; 6 vertical bars on body, the first from origin of dorsal to base of pectoral, the sixth from soft dorsal to anal; three round pale (? orange) spots on anal in male.

The type, 105 mm. in total length.



3. *PSEUDOTROPHEUS NOVEMFASCIATUS*, sp. n.

Depth of body 3 in length, length of head  $3\frac{1}{4}$ . Snout with convex profile, as long as diameter of eye, which is  $3\frac{1}{2}$  in length of head, equal to interorbital width, greater than depth of præorbital or cheek. Mouth rounded, lower jaw shorter than upper; maxillary reaching vertical from anterior edge of eye; teeth in 5 or 6 series, about 40 in outer series of upper jaw, anteriorly bicuspid, the last 6 to 8 on each side conical, some enlarged. 5 series of scales on cheek. 10 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 32 scales in a longitudinal series, 6 from origin of dorsal to lateral line. Dorsal XVIII 9; last spine  $\frac{1}{2}$  length of head. Anal III 8; third spine as long as and stronger than last dorsal. Pectoral shorter than head, not reaching anal. Caudal truncate. Caudal peduncle as long as deep. Body crossed by 9 dark vertical bars, the first 6 corresponding to the 6 of *P. zebra*, the last 2 on caudal peduncle; end of snout and lower jaw blackish; an opercular spot and a spot on base of caudal; a faint dark band on lateral line and another on middle of side; spinous dorsal with a dusky intramarginal band; soft dorsal and caudal with series of spots.

A single specimen, 65 mm. in total length (*Wood*).

4. *PSEUDOTROPHEUS AURATUS* Bouleng., 1897.

*Tilapia aurata* Bouleng. Cat. Afr. Fish. iii. p. 246, fig. 164.

Depth of body  $3\frac{2}{3}$  in length, length of head  $3\frac{1}{3}$ . Snout with convex profile, a little longer than diameter of eye, which is 4 in length of head, a little greater than interorbital width, depth of præorbital, or cheek. Mouth rounded; lower jaw shorter than upper; maxillary nearly reaching vertical from anterior edge of eye; teeth in 5 or 6 series, 45 in outer series of upper jaw, the last 4 or 5 conical, enlarged. 4 series of scales on cheek. 9 or 10 gill-rakers on lower part of anterior arch. 33 scales in a longitudinal series. Dorsal XIX 8; last spine  $\frac{2}{5}$  length of head. Anal III 7; third spine as long as last dorsal. Pectoral  $\frac{3}{4}$  length of head, not reaching anal. Caudal densely scaled, truncate. Caudal peduncle a little longer than deep. Lips blackish; two black bands between eyes; a black stripe from eye, ending in a spot on base of caudal; a second near edge of back, a third on dorsal fin.

The type, 75 mm. in total length.

5. *PSEUDOTROPHEUS TROPHEUS*, sp. n. (Text-fig. 3.)

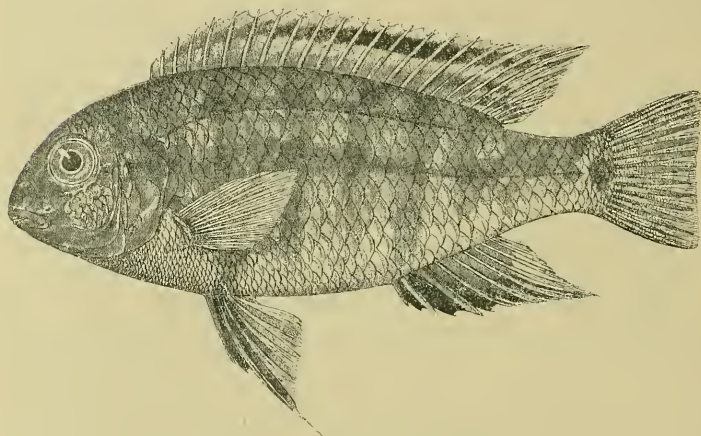
Depth of body  $2\frac{2}{3}$  to 3 in length, length of head  $3\frac{1}{2}$ . Upper profile of head very convex; snout as long as diameter of eye, which is  $3\frac{2}{3}$  in length of head, slightly exceeds præorbital depth and equals depth of cheek; interorbital region convex, its width  $2\frac{2}{3}$  to  $2\frac{3}{4}$  in length of head. Mouth subterminal, transverse; jaws with 8 series of small cuspidate teeth; a series of 6 to 8 well-differentiated conical teeth on each side of præmaxillary. 4 series of scales on



cheek. 9 gill-rakers on lower part of anterior arch. Pharyngeal teeth small, slender. 33 scales in a longitudinal series, 6 from origin of dorsal to lateral line. Dorsal XVII 10; last spine  $\frac{1}{2}$  length of head. Anal III 8; third spine stronger and as long as or a little shorter than last dorsal. Pectoral a little shorter than head, not reaching anal. Caudal scaly, truncate. Caudal peduncle as long as or a little longer than deep. Traces of dark cross-bars on body bearing a series of darker spots above lateral line and another on middle of side; an opercular spot and a spot on base of caudal; dorsal with a blackish intramarginal band.

Two specimens, 116 and 122 mm. in total length (*Wood*).

Text-figure 3.



*Pseudotropheus tropheops*.  $\frac{3}{4}$ .

#### 8. CYNOTILAPIA, gen. n.

Near *Pseudotropheus*, but teeth conical, in a few series, outer large, in lower jaw forming distinct canines anteriorly.

Nyassa; a single species.

CYNOTILAPIA AFRA Günth., 1893.

*Paratilapia afra* Bouleng. Cat. Afr. Fish. iii. p. 325, fig. 218.

Depth of body  $2\frac{3}{4}$  to 3 in length, length of head 3 to  $3\frac{1}{4}$ . Snout decurved, as long as or a little longer than diameter of eye, which is  $3\frac{1}{3}$  to  $3\frac{1}{2}$  in length of head, greater than præorbital depth; interorbital width  $3\frac{1}{3}$  in length of head. Jaws equal anteriorly; maxillary not quite reaching vertical from anterior edge of eye; teeth conical, triserial, outer large, 28 to 32 in upper jaw; lower jaw with four strong anterior canines. 3 or 4 series of scales in cheek. 14 or 15 gill-rakers on lower part of anterior arch. 33 scales in a longitudinal series, 6 from origin of dorsal

to lateral line. Dorsal XVII 9; last spine  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Anal III 8; third spine stronger and as long as or a little shorter than last dorsal. Pectoral shorter than head, not reaching anal. Caudal? Caudal peduncle as long as or longer than deep.

The types, 85 and 95 mm. in total length.

#### 9. SERRANOCHROMIS Regan, 1920.

As *Haplochromis*, but third vertebra without inferior apophyses, fourth with a very small pair. Mouth large; teeth conical; cheek deep, with 7 to 9 series of scales.

A single species.

SERRANOCHROMIS THUMBERGII Casteln., 1861.

*Paratilapia thumbergii* Bouleng. Cat. Afr. Fish. iii. p. 328, fig. 220.

Nyassa and Zambezi; Katanga and L. Bangwelu; L. Ngami; Angola.

#### 10. HAPLOCHROMIS Hilgend., 1888

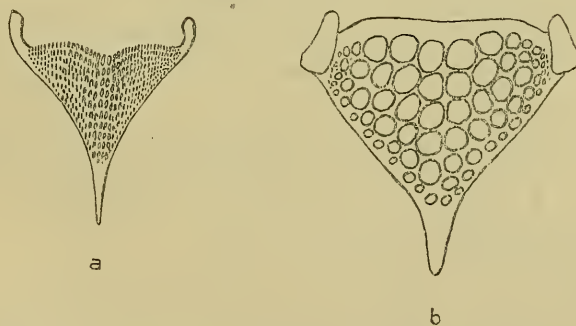
(type *H. obliquidens* Hilgend.).

*Ctenochromis* Pfeff., 1893 (*pectoralis*).

*Champsochromis* Bouleng., 1915 (*ceruleus*).

An outer series of bicuspid or conical teeth, decreasing in size posteriorly, and one or more inner series of smaller bicuspid, or

Text-figure 4.



a. Lower pharyngeal of *Haplochromis tetrastigma*.

b. „ „ „ *H. placodon*.

conical teeth. 2 to 6 series of scales on cheek. Scales usually distinctly denticulate. Pharyngeal apophysis formed by parasphenoid in middle and basioccipital at sides. Third vertebra with inferior apophyses, which meet below.

52 species of this genus occur in Nyassa, all of them endemic. In the great number and diversity of species of *Haplochromis*

Nyassa resembles Victoria and differs notably from Tanganyika. In the Nyassa species the caudal fin is truncate or emarginate, and appears to be always nearly completely covered with small scales in the adult fish; this feature, the prevalence of a few distinctive types of coloration, and the absence of evident relationship to species found elsewhere lead to the conclusion that the Nyassa species are a natural group and may perhaps have evolved in the lake from a single ancestral form. This conclusion is fortified by the study of such skeletons as are available.

The differences in the pharyngeal dentition between closely related species are sometimes very striking; the best examples of this are *H. tetrastigma* and *H. placodon*, and *H. similis* and *H. kirkii*; these cases make it evident that it is not desirable to regard the development of large, round, blunt pharyngeal teeth as warranting generic separation.

### *Synopsis of the Nyassa Species.*

- I. Snout not longer than postorbital part of head.
  - A. Pectoral fin with series of spots on the rays.
 

Lower jaw projecting .....	1. <i>livingstonii</i> .
Jaws equal; depth of body $2\frac{3}{4}$ to 3 in length .....	2. <i>polystigma</i> .
Jaws equal; depth $2\frac{3}{4}$ in length .....	3. <i>maculimanus</i> .
  - B. Pectoral fin immaculate.
    1. Premaxillary pedicels not extending beyond anterior edge of orbits.
      - a. Body with a series of dark spots on back alternating with a series on or above middle of side, or uniting with them to form irregular cross-bars. Jaws equal; outer teeth mostly bicuspid.
 

Pharyngeal teeth small; spots very large .....	4. <i>simulans</i> .
Middle pharyngeal teeth enlarged, blunt; caudal peduncle $1\frac{1}{2}$ to $1\frac{3}{4}$ as long as deep .....	5. <i>subocularis</i> .
Middle pharyngeal teeth enlarged, blunt; caudal peduncle a little longer than deep .....	6. <i>ornatus</i> .
      - b. Body with 6 dark cross-bars. Lower jaw projecting; outer teeth bicuspid.
 

Pharyngeal teeth small .....	7. <i>johnstoni</i> .
Lower pharyngeal with a group of enlarged blunt teeth ..	8. <i>sexfasciatus</i> .
      - c. Body with a dark lateral stripe, slightly curved anteriorly, from head to caudal fin. Outer teeth bicuspid.
        - a. Lower jaw a little projecting; middle pharyngeal teeth stout and blunt .....
 9. *kirkii*. |        - b. Jaws equal; pharyngeal teeth small.
 

Caudal truncate or slightly emarginate .....	10. <i>similis</i> .
Caudal rather deeply emarginate; 45 to 60 teeth in outer series .....	11. <i>breviceps</i> .
Caudal rather deeply emarginate; 24 to 30 teeth in outer series .....	12. <i>microstoma</i> .
        - d. Body with a dark lateral band on tail, continued forward as a series of spots. Teeth conical. Lower jaw projecting.
 

Teeth conical. Lower jaw projecting. ..	13. <i>urotaenia</i> .
---	------------------------
        - e. Body with a straight dark band or stripe from head to caudal fin. Teeth conical. Lower jaw projecting.
          - a. Mouth little oblique, below level of eye.
 

Caudal truncate or very slightly emarginate .....	14. <i>fuscoteniatus</i> .
Caudal distinctly emarginate .....	15. <i>holotaenia</i> .
          - b. Mouth very oblique, anteriorly on a level with eye.
 

Depth of body $2\frac{3}{4}$ to $2\frac{5}{8}$ in length .....	16. <i>strigatus</i> .
Depth of body 4 in length .....	17. <i>dimidiatus</i> .

- f.* An opercular spot and a blackish spot on or under lateral line below middle of spinous dorsal; often a third spot below soft dorsal and a fourth at base of caudal  $\frac{1}{2}$ .
- α.* 8 to 13 gill-rakers on lower part of anterior arch (? *H. intermedius*).  
\* Outer teeth bispid; lower jaw not projecting.
- Maxillary extending to below eye ..... 18. *auritus*.  
Maxillary not extending to below eye; pharyngeal teeth small ..... 19. *tetrastigma*.  
Maxillary not extending to below eye; pharyngeal teeth large, rounded, blunt ..... 20. *placodon*.  
\*\* Outer teeth conical; lower jaw projecting (? *H. intermedius*).
- Snout a little shorter than postorbital part of head; last dorsal spine nearly  $\frac{1}{2}$  length of head ..... 21. *intermedius*.  
Snout as long as postorbital part of head; last dorsal spine  $\frac{3}{4}$ , interorbital width  $\frac{1}{2}$  length of head ..... 22. *modestus*.  
Snout as long as postorbital part of head; last dorsal spine  $\frac{1}{3}$  to  $\frac{2}{3}$ , interorbital width  $\frac{1}{6}$  or  $\frac{1}{4}$  length of head ..... 23. *woodi*.
- β.* 17 to 28 gill-rakers on lower part of anterior arch.  
17 to 21 gill-rakers; 15 or 16 dorsal spines ..... 24. *chrysonotus*.  
23 to 28 gill-rakers; 17 or 18 dorsal spines ..... 25. *quadrimaculatus*.
- g.* A dark band from nape or origin of dorsal to base of caudal (sometimes faint or absent in large specimens).  
*α.* Lower pharyngeal with a group of large, rounded, blunt teeth.  
Jaws equal; caudal peduncle  $1\frac{1}{4}$  to  $1\frac{1}{2}$  as long as deep ..... 26. *sphaerodon*.  
Jaws equal; caudal peduncle  $1\frac{1}{2}$  as long as deep ..... 27. *ericotania*.  
Lower jaw projecting ..... 28. *lateristriga*.
- β.* Lower pharyngeal teeth of the 2 middle series a little enlarged.  
Eye 3 to 4 in head (in specimens of 70 to 110 mm.) ..... 29. *plagiotaenia*.  
Eye 3 to  $3\frac{1}{2}$  in head (in specimens of 120 to 170 mm.) ..... 30. *melanotania*.
- γ.* Pharyngeal teeth small; outer teeth of jaws forming a close-set series, usually bicuspid in young, some or all conical in adult.  
\* Lower jaw a little shorter than upper ... 31. *guentheri*.  
\*\* Jaws equal; 18 or 19 dorsal spines ..... 32. *melanonotus*.  
\*\*\* Jaws equal or lower a little projecting; 15 to 17 dorsal spines.  
† Maxillary extending to vertical from anterior edge of eye.  
8 or 9 gill-rakers on lower part of anterior arch ..... 33. *brevis*.  
12 gill-rakers; 35 or 36 scales; caudal peduncle  $1\frac{1}{2}$  as long as deep ..... 34. *nototania*.  
11 to 13 gill-rakers; 37 to 39 scales; caudal peduncle  $1\frac{3}{4}$  to 2 as long as deep ..... 35. *lepturus*.  
†† Maxillary not extending to below eye.  
Scales 35 to 37; last dorsal spine  $\frac{1}{4}$  to  $\frac{1}{2}$  head ..... 36. *rhoadesii*.  
Scales 33 or 34; last dorsal spine quite  $\frac{2}{3}$  head ..... 37. *atriteniatus*.
- δ.* Pharyngeal teeth slender; outer teeth of jaws conical, rather strong, and spaced.  
\* Third anal spine as long as last dorsal; pelvic fins shorter than head ..... 38. *spilorhynchus*.  
\*\* Third anal spine shorter than last dorsal; pelvic fins as long as head.
- Maxillary not quite reaching vertical from anterior edge of eye ..... 39. *longipes*.  
Maxillary not nearly reaching vertical from anterior edge of eye ..... 40. *ceruleus*.
- h.* Coloration silvery, sometimes with faint dark cross-bars.  
*α.* Maxillary extending to below anterior edge of eye.  
Lower pharyngeal with a group of enlarged teeth with spherical crowns ..... 41. *macrochir*.  
Posterior teeth of 2 middle series of lower pharyngeal somewhat enlarged ..... 42. *argyrosoma*.

† I include *H. modestus* here, but its coloration is unknown; the type, as preserved, is uniformly brownish.

β. Maxillary not extending to below eye.

Lower jaw a little the shorter; 12 or 13 gill-rakers on lower part of anterior arch.....	43. <i>macrophthalmus</i> .
Jaws equal anteriorly; 11 gill-rakers on lower part of anterior arch.....	44. <i>leuciscus</i> .
Jaws equal; 15 or 16 gill-rakers.....	45. <i>inornatus</i> .
Lower jaw a little the shorter; 16 or 17 gill-rakers.....	46. <i>micrentodon</i> .

2. Premaxillary pedicels extending to between middle of orbits.

II. Snout longer than postorbital part of head.	47. <i>eucinostomus</i> .
A. Lower jaw projecting; maxillary not extending to below eye.	
Teeth cuspidate; caudal emarginate.....	48. <i>præorbitalis</i> .
Teeth conical; caudal truncate.....	49. <i>compressiceps</i> .
B. Jaws equal anteriorly; maxillary not extending to below eye.	
15 to 17 gill-rakers on lower part of anterior arch.....	50. <i>macrorhynchus</i> .
19 or 20 gill-rakers on lower part of anterior arch.....	51. <i>rostratus</i> .

C. Jaws equal anteriorly; maxillary extending to below eye.

52. *macrostoma*.

1. HAPLOCHROMIS LIVINGSTONII Günth., 1893.

*Haplochromis livingstonii* (part.) Bouleng. Cat. Afr. Fish. iii. p. 286, fig. 194.

Depth of body  $2\frac{3}{5}$  to 3 in length, length of head  $2\frac{3}{4}$  to 3. Snout with straight profile,  $1\frac{1}{2}$  to 2 diameter of eye, which is  $4\frac{1}{4}$  to  $5\frac{1}{2}$  in length of head, interorbital width  $3\frac{1}{2}$  to 4, depth of præorbital  $3\frac{1}{2}$  to 4. Lower jaw projecting; maxillary not extending to below eye; teeth in 3 or 4 series, outer bicuspid and inner tricuspid in young, all conical in adult, 50 to 60 in outer series of upper jaw. 4 or 5 series of scales on cheek. 11 or 12 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 33 to 35 scales in a longitudinal series, 6 or 7 from origin of dorsal to lateral line. Dorsal XVI 10–11; last spine  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head. Anal III 9–10; third spine  $\frac{1}{3}$  to  $\frac{2}{5}$  head. Pectoral a little shorter than head, reaching origin of anal. Caudal truncate or slightly emarginate. Caudal peduncle longer than deep. Silvery (♀) or bluish grey (♂); a dark bar from eye to end of maxillary; a large opercular spot; body marbled with blackish, the spots and bands constantly nearly as in the figure of the type; pectoral with series of small spots on the rays; dorsal and anal, in male, blackish with pale edge.

The type, 120 mm. long, and three specimens of 200 to 230 mm. (Wood).

2. HAPLOCHROMIS POLYSTIGMA, sp. n. (Pl. I.)

*Haplochromis livingstonii* (part.) Bouleng. Cat. Afr. Fish. iii. p. 286.

Depth of body  $2\frac{3}{5}$  to 3 in length, length of head about 3. Snout with straight profile,  $1\frac{1}{2}$  to  $2\frac{1}{2}$  diameter of eye, which is 4 to 6 in length of head, interorbital width  $3\frac{1}{3}$  to 4, depth of præorbital  $3\frac{3}{4}$  to  $4\frac{1}{2}$ . Jaws equal anteriorly; maxillary not extending to below eye; teeth in 3 or 4 series in upper jaw, 2 or 3 in lower, outer bicuspid and inner tricuspid in young, all conical



in adult, 50 to 65 in outer series of upper jaw. 4 or 5 series of scales on cheek. 10 to 13 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 32 to 34 scales in a longitudinal series, 6 from origin of dorsal to lateral line. Dorsal XVI 10-11; last spine  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head. Anal III 9-10; third spine usually a little shorter than last dorsal. Pectoral as long as or a little shorter than head, nearly or quite reaching anal. Caudal truncate or slightly emarginate. Caudal peduncle longer than deep. Body with large irregular brown spots tending to run together to form 3 longitudinal bands; head, body, and vertical fins covered with numerous small dark spots; pectoral with series of spots on the rays.

Six specimens (Wood), 120-210 mm. in total length; two others (Rhoades, Cunningham) also belong to this species.

### 3. HAPLOCHROMIS MACULIMANUS, sp. n.

*Paratilapia modesta* (part.) Bouleng. Cat. Afr. Fish. iii. p. 326.

Depth of body  $2\frac{2}{5}$  in length, length of head nearly 3. Snout with straight profile, shorter than postorbital part of head. Diameter of eye 5 in length of head, a little less than preorbital depth,  $\frac{2}{3}$  depth of cheek; interorbital width 4 in head. Jaws equal anteriorly; maxillary not extending to below eye; teeth conical, in 4 series, about 80 in outer series of upper jaw. 5 series of scales on cheek. 11 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 33 scales in a longitudinal series, 7 from origin of dorsal to lateral line. Dorsal XVI 11. Anal III 10; third spine  $\frac{1}{3}$  head, a little shorter than last dorsal. Caudal peduncle a little longer than deep. Traces of dark cross-bars; pectoral with several transverse series of small dark spots.

A single specimen, 190 mm. long (Moore).

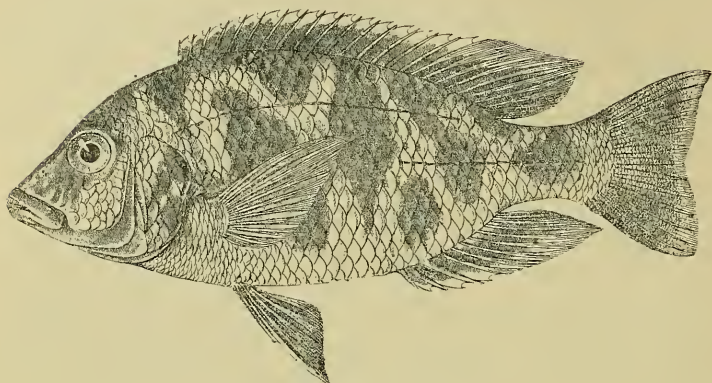
### 4. HAPLOCHROMIS SIMULANS, sp. n. (Text-fig. 5.)

Depth of body  $2\frac{1}{2}$  in the length, length of head 3 to  $3\frac{1}{5}$ . Snout with straight or convex profile,  $1\frac{1}{4}$  to  $1\frac{2}{3}$  diameter of eye, which is  $3\frac{2}{3}$  to  $4\frac{1}{2}$  in length of head, interorbital width 4, depth of preorbital 4 to  $4\frac{1}{2}$ . Jaws equal anteriorly; maxillary not extending to below eye; teeth in 4 to 6 series, outer bicuspid, or posteriorly conical in adults, 60 to 75 in outer series of upper jaw. 3 or 4 series of scales on cheek. 10 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 32 to 34 scales in a longitudinal series, 6 or 7 from origin of dorsal to lateral line. Dorsal XVI 10-11; last spine  $\frac{1}{3}$  to more than  $\frac{2}{5}$  length of head. Anal III 9; third spine as long as last dorsal. Pectoral as long as or a little shorter than head, nearly or quite reaching anal. Caudal truncate or slightly emarginate. Caudal peduncle as long as or a little longer than deep. Silvery or yellowish; a dark bar below eye; an opercular spot; 4 large dark spots on back alternating

with 4 very large, vertically expanded spots on side, the spots sometimes confluent to form broad irregular cross-bands; dorsal and anal dusky with yellow margin, or anal pale yellow; caudal dusky above, yellow below.

Four specimens, 130 to 190 mm. in total length (*Wood*).

Text-figure 5.



*Haplochromis simulans*.  $\frac{1}{2}$ .

This species bears a great resemblance and is probably closely related to *Cyrtocara venusta*, but differs in the structure of the spinous dorsal fin.

##### 5. HAPLOCHROMIS SUBOCULARIS Günth., 1893.

P. Z. S. p. 621, pl. liv. fig. B.

*Tilapia johnstoni* (part.) Bouleng. Cat. Afr. Fish. iii. p. 249.

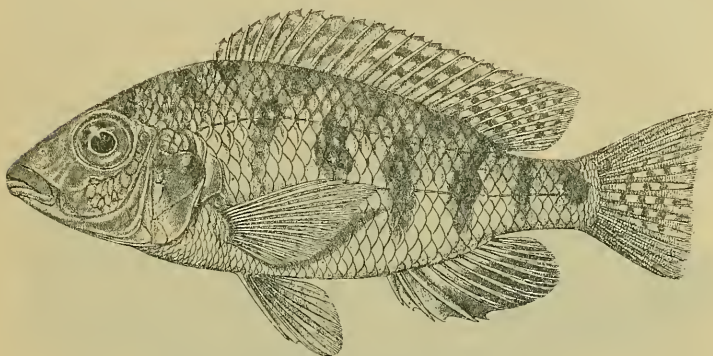
Depth of body 3 to  $3\frac{1}{4}$  in length, length of head  $3\frac{1}{5}$  to  $3\frac{2}{5}$ . Snout with straight or slightly convex profile, a little longer than diameter of eye, which is  $3\frac{1}{2}$  to  $3\frac{3}{4}$  in length of head; inter-orbital width  $3\frac{2}{3}$  to 4 in head, depth of preorbital  $4\frac{1}{2}$ . Jaws equal anteriorly; maxillary not extending to below eye; teeth in 4 or 5 series, outer bicuspid, 40 to 50 in outer series of upper jaw. 3 series of scales on cheek. 10 gill-rakers on lower part of anterior arch. Middle pharyngeal teeth enlarged, rounded, blunt. 32 or 33 scales in a longitudinal series, 5 or 6 from origin of dorsal to lateral line. Dorsal XV 11-12; last spine  $\frac{2}{3}$  to  $\frac{1}{2}$  length of head. Anal III 8; third spine  $\frac{1}{3}$  to  $\frac{2}{5}$  head. Pectoral as long as head, nearly or quite reaching anal. Caudal truncate or slightly emarginate. Caudal peduncle  $1\frac{1}{2}$  to  $1\frac{3}{4}$  as long as deep. Two dark bars across nape; 4 dark spots at base of dorsal alternating with a series above middle of side; 2 large spots on caudal peduncle; dorsal and caudal with series of spots.

Two specimens, 120 and 140 mm. in total length.

6. *HAPLOCHROMIS ORNATUS*, sp. n. (Text-fig. 6.)

Depth of body equal to length of head,  $2\frac{3}{4}$  in length of fish. Snout with slightly convex profile, as long as postorbital part of head. Diameter of eye  $1\frac{1}{2}$  depth of præorbital, greater than depth of cheek,  $3\frac{1}{2}$  in length of head: interorbital width 4 in length of head. Jaws equal anteriorly; lips thick; maxillary not extending to below eye; teeth in 3 series in upper jaw, 4 in the lower; 52 bicuspid teeth in outer series of upper jaw. 3 series of scales on cheek. 12 gill-rakers on lower part of anterior arch. Middle pharyngeal teeth enlarged, rounded, blunt. 31 scales in a longitudinal series, 6 from origin of dorsal to lateral line. Dorsal XVI 10; spines rather strong, last a little more than  $\frac{2}{5}$  length of head. Anal III 9; third spine stronger than dorsals,

Text-figure 6.

*Haplochromis ornatus*.  $\frac{2}{3}$ .

$\frac{2}{3}$  head. Pectoral nearly as long as head, reaching anal. Caudal feebly emarginate. Caudal peduncle a little longer than deep. Silvery; an opercular spot and a spot above eye; 5 dark spots at base of dorsal alternating with a series above middle of side; 2 dark bars across upper  $\frac{1}{2}$  of caudal peduncle; dorsal and caudal with series of spots.

A single specimen, 140 mm. in total length (Wood).

7. *HAPLOCHROMIS JOHNSTONI* Günth., 1893.

*Tilapia johnstoni* (part.) Bouleng. Cat. Afr. Fish. iii. p. 249, fig. 167.

Depth of body  $2\frac{3}{4}$  in length, length of head 3. Snout with straight profile, as long as postorbital part of head. Diameter of eye 4 in length of head, interorbital width  $4\frac{1}{2}$ , depth of præorbital  $4\frac{1}{4}$ . Lower jaw projecting; maxillary not extending to below eye; teeth in 3 or 4 series, outer bicuspid, 50 in outer series of upper jaw. 3 series of scales on cheek. 11 gill-rakers

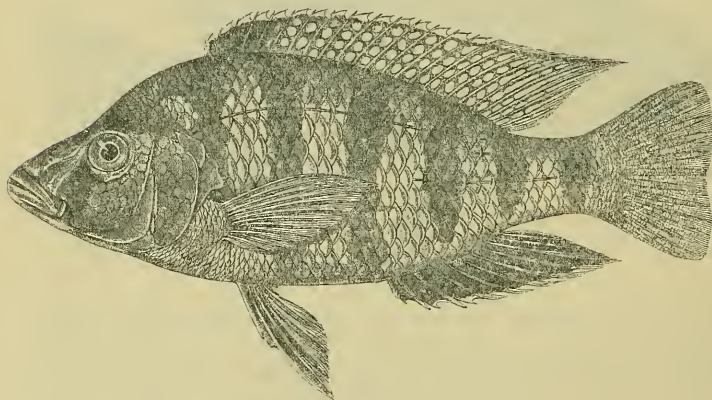
on lower part of anterior arch. Pharyngeal teeth small, compressed. 31 scales in a longitudinal series, 5 from origin of dorsal to lateral line. Dorsal XVI 10; last spine a little less than  $\frac{1}{2}$  length of head. Anal III 9; third spine stronger than dorsals, nearly  $\frac{2}{5}$  head. Pectoral  $\frac{4}{5}$  head, reaching origin of anal. Caudal truncate or slightly emarginate. Caudal peduncle  $1\frac{1}{3}$  as long as deep. Silvery; a dark bar from eye to angle of mouth; 6 dark bars on body, the first downwards from nape, the fifth from end of dorsal to behind anal; series of spots on dorsal and caudal.

The type, 120 mm. in total length.

8. *HAPLOCHROMIS SEXFASCIATUS*, sp. n. (Text-fig. 7.)

Depth of body  $2\frac{3}{5}$  to  $2\frac{1}{2}$  in the length, length of head 3. Upper profile of head a little concave; snout  $1\frac{1}{2}$  to 2 diameter of eye, which is 4 to 5 in length of head, interorbital width  $3\frac{2}{3}$  to  $4\frac{1}{4}$ , præorbital depth 4 to  $4\frac{1}{2}$ . Lower jaw projecting; maxillary not

Text-figure 7.



*Haplochromis sexfasciatus*.  $\frac{1}{2}$ .

extending to below eye; teeth in 3 to 5 series, 40 to 60 bicuspid teeth in outer series of upper jaw. 3 or 4 series of scales on cheek. 11 or 12 gill-rakers on lower part of anterior arch. Lower pharyngeal with a group of moderately enlarged blunt rounded teeth in the middle posteriorly. 32 scales in a longitudinal series, 6 from origin of dorsal to lateral line. Dorsal XV 11; last spine  $\frac{2}{5}$  to nearly  $\frac{1}{2}$  length of head. Anal III 8-9; third spine stronger than last dorsal,  $\frac{1}{3}$  to  $\frac{2}{5}$  head. Pectoral  $\frac{4}{5}$  to  $\frac{7}{8}$  length of head, reaching origin of anal. Caudal truncate or slightly emarginate. Caudal peduncle  $1\frac{1}{4}$  as long as deep. Body with 6 blackish cross-bars; dorsal and caudal with series of spots.

Two specimens, 100 and 170 mm. in total length (*Wood*).



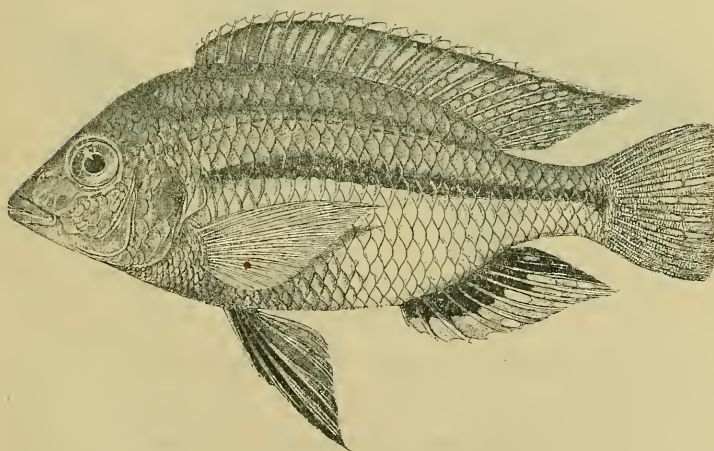
9. *HAPLOCHROMIS KIRKII* Günth., 1893.

*Tilapia kirkii* (part.) Bouleng. Cat. Afr. Fish. iii. p. 251, fig. 169.

Depth of body  $2\frac{1}{2}$  to  $2\frac{3}{4}$  in length, length of head about 3. Snout with straight profile,  $1\frac{1}{4}$  to  $1\frac{1}{2}$  diameter of eye, which is  $3\frac{3}{4}$  to  $4\frac{1}{4}$  in length of head, in adult equal to præorbital depth; interorbital width  $3\frac{1}{2}$  to  $4\frac{1}{4}$  in length of head. Lower jaw a little projecting; maxillary extending to between nostril and eye; teeth in 4 or 5 well-separated series, inner tricuspid, outer bicuspid; 40 to 45 in outer series of upper jaw. 3 or 4 series of scales on cheek. 11 or 12 gill-rakers on lower part of anterior arch. Middle pharyngeal teeth stout and blunt. 31 to 33 scales in a longitudinal series, 5 or 6 from origin of dorsal to lateral line. Dorsal XV 10-11; last spine  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Anal III 8-10; third spine as long as or a little shorter than last dorsal. Pectoral as long as or a little shorter than head, reaching origin of anal. Caudal truncate or slightly emarginate. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  as long as deep. A dark stripe from operculum to caudal. Usually a stripe or a series of spots above upper lateral line and another at base of dorsal; dorsal and caudal with series of spots; anal with ocelli in males.

Seven specimens, 100-160 mm. long (*Johnston, Rendall, Wood*).

Text-figure 8.

*Haplochromis similis*.  $\frac{2}{3}$ .10. *HAPLOCHROMIS SIMILIS*, sp. n. (Text-fig. 8.)

Depth of body  $2\frac{1}{2}$  to  $2\frac{1}{2}$  in length, length of head 3 to  $3\frac{1}{3}$ . Snout with straight or slightly convex profile, as long as or longer than diameter of eye, which is  $3\frac{1}{4}$  to  $3\frac{3}{4}$  in length of head, greater than præorbital depth; interorbital width  $3\frac{1}{3}$  to  $3\frac{2}{3}$  in



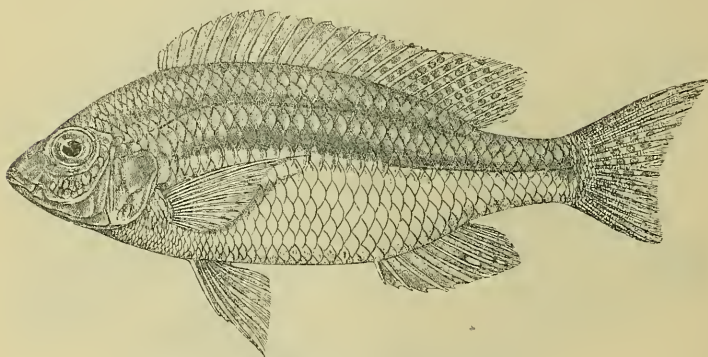
length of head. Jaws equal anteriorly; maxillary ending between nostril and eye; teeth in 4 to 6 series, outer bicuspid, inner tricuspid, 40 to 52 in outer series of upper jaw. 3 or 4 series of scales on cheek. 11 to 13 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 32 or 33 scales in a longitudinal series, 5 or 6 from origin of dorsal to lateral line. Dorsal XVI-XVII 9-10; last spine  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Anal III 9-10; third spine a little shorter than last dorsal. Pectoral as long as or a little shorter than head, nearly or quite reaching anal. Caudal truncate or slightly emarginate. Caudal peduncle  $1\frac{1}{4}$  to  $1\frac{1}{2}$  as long as deep. Coloration as in *H. kirkii*.

Five specimens, 120-150 mm. long (*Wood*).

11. *HAPLOCHROMIS BREVICEPS*, sp. n. (Text-fig. 9.)

Depth of body 3 in the length, length of head  $3\frac{3}{5}$ . Snout a little shorter or longer than diameter of eye, which is 3 to  $3\frac{2}{3}$  in length of head, greater than depth of preorbital or cheek; interorbital width 4 in length of head. Jaws equal anteriorly; maxillary not extending to below eye; teeth in 2 or 3 series;

Text-figure 9.



*Haplochromis breviceps*.  $\frac{2}{3}$ .

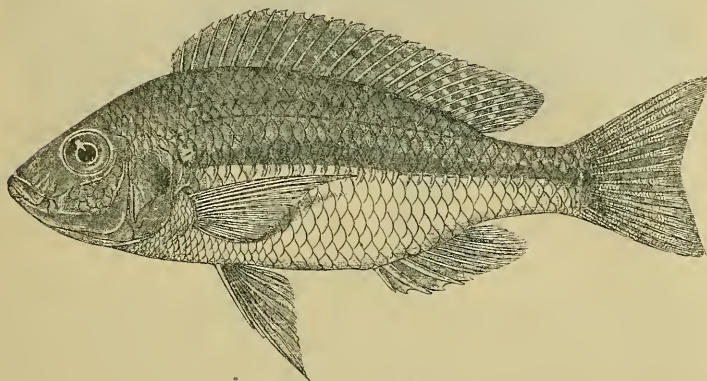
45 to 60 bicuspid teeth in outer series of upper jaw; 2 series of scales on cheek. 14 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 33 to 35 scales in a longitudinal series, 5 or 6 from origin of dorsal to lateral line. Dorsal XVI-XVII 11; last spine  $\frac{2}{5}$  length of head. Anal III 9; third spine stronger than dorsals,  $\frac{1}{3}$  or a little more than  $\frac{1}{3}$  head. Pectoral as long as head, not reaching anal. Caudal emarginate. Caudal peduncle  $1\frac{2}{3}$  as long as deep. Silvery; a narrow dusky band from opercular spot to base of caudal, another along upper lateral line, a third at base of dorsal. Dorsal and caudal with series of orange spots; male with ocelli in anal.

Two specimens, 85 and 135 mm. in total length (*Wood*).

12. *HAPLOCHROMIS MICROSTOMA*, sp. n. (Text-fig. 10.)*Tilapia kirkii* (part.) Bouleng. Cat. Afr. Fish. iii. p. 251.

Depth of body 3 in length, length of head  $3\frac{1}{3}$  to  $3\frac{1}{2}$ . Snout straight, as long as or longer than diameter of eye, which is  $3\frac{1}{2}$  to 4 in length of head, a little or considerably greater than præorbital depth: interorbital width 4 in length of head. Mouth small; jaws equal anteriorly; maxillary ending a little behind nostril; teeth in 4 well-separated series, inner tricuspid, outer bicuspid, 24 to 30 in outer series of upper jaw. 3 or 4 series of scales on cheek. 11 gill-rakers on lower part of anterior arch.

Text-figure 10.

*Haplochromis microstoma*.  $\frac{3}{4}$ .

Pharyngeal teeth small. 33 or 34 scales in a longitudinal series, 5 or 6 from origin of dorsal to lateral line. Dorsal XVII 11; last spine  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Anal III 9; third spine a little shorter than last dorsal. Pectoral as long as head, not reaching anal. Caudal deeply emarginate. Caudal peduncle  $1\frac{1}{2}$  as long as deep. Silvery; a dark lateral band from operculum to base of caudal; two series of small dark spots, one at base of dorsal, the other above lateral line; dorsal spotted.

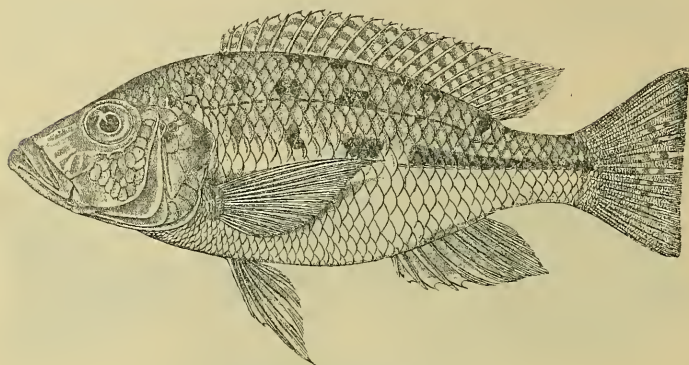
Two specimens, 80 mm. (*Wood*) and 115 mm. (*Rhoades*) in length.

13. *HAPLOCHROMIS UROTÆNIA*, sp. n. (Text-fig. 11.)

Depth of body  $2\frac{2}{3}$  to 3 in length, length of head  $2\frac{1}{3}$  to 3. Snout with straight upper profile, in adult as long as postorbital part of head. Diameter of eye 4 to  $4\frac{1}{2}$  in length of head, equal to or a little less than præorbital depth, less than depth of cheek; interorbital width  $3\frac{3}{4}$  to 4 in length of head. Lower jaw a little projecting; maxillary not quite reaching vertical from anterior edge of eye; teeth conical in 2 or 3 series, 35 to 45 in outer

series of upper jaw. 3 or 4 series of scales on cheek. 11 or 12 gill-rakers on lower part of anterior arch. Pharyngeal teeth slender. 33 scales in a longitudinal series, 5 or 6 from origin of dorsal to lateral line. Dorsal XVI 9-10; last spine about  $\frac{1}{3}$  length of head. Anal III 8-9; third spine stronger and shorter than last dorsal. Pectoral  $\frac{4}{5}$  head, nearly or quite reaching anal.

Text-figure 11.

*Haplochromis urotænia*.  $\frac{2}{7}$ .

Caudal truncate or feebly emarginate. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{2}{3}$  as long as deep. A series of about 8 dark spots near dorsal profile, a second above lateral line, a third on middle of side posteriorly confluent to form a band; dorsal with series of spots.

Three specimens, 170 to 200 mm. in total length (*Wood*).

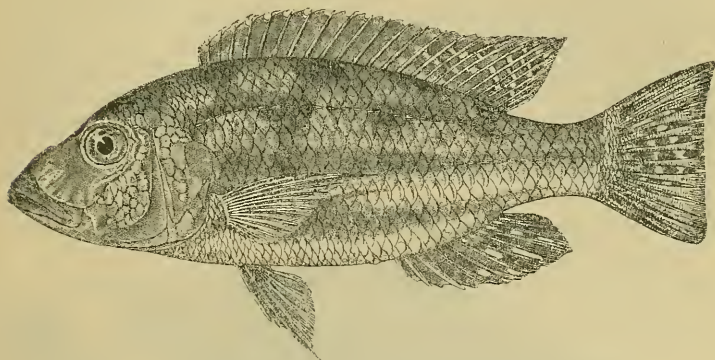
#### 14. *HAPLOCHROMIS FUSCOTÆNIATUS*, sp. n. (Text-fig. 12.)

Depth of body  $2\frac{3}{4}$  in length, length of head  $2\frac{3}{4}$ . Head  $2\frac{1}{2}$  as long as broad. Snout a little concave in front of eye, thence straight, nearly twice as long as diameter of eye, which is 5 in length of head, interorbital width 5, præorbital depth 4. Lower jaw a little projecting; maxillary not quite reaching vertical from anterior edge of eye; teeth conical, in 3 series, 60 in outer series of upper jaw. Cheek with 4 series of scales, depth  $1\frac{2}{3}$  diameter of eye. 12 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 34 scales in a longitudinal series, 6 from origin of dorsal to lateral line. Dorsal XVI 11; spines strongly increasing to last, which is  $\frac{1}{3}$  length of head. Anal III 10; third spine stronger and a little shorter than last dorsal. Pectoral  $\frac{4}{5}$  head, nearly reaching anal. Caudal truncate. Caudal peduncle  $1\frac{1}{3}$  as long as deep. Sides yellowish; a dusky band on middle of side, a second backwards from base of pectoral; a series of dusky spots at base of dorsal, connected with a second

series which form an interrupted band on and above lateral line. Dorsal with series of spots. Anal with some pale (? red) round spots.

A single specimen, 175 mm. in total length (*Wood*).

Text-figure 12.



*Haplochromis fuscotæniatus*.  $\frac{1}{2}$ .

15. *HAPLOCHROMIS HOLOTÆNIA*, sp. n.

*Paratilapia dimidiata* (part.) Bouleng. Cat. Afr. Fish. iii. p. 360, fig. 244.

Depth of body  $3\frac{1}{4}$  in length, length of head 2. Snout decurved, shorter than postorbital part of head. Diameter of eye  $4\frac{1}{2}$  in length of head, equal to interorbital width or præorbital depth, less than depth of cheek. Lower jaw a little projecting: maxillary not extending to below eye; teeth mostly conical, in 4 series in upper jaw and 3 in lower, 60 in outer series of upper jaw. 4 series of scales on cheek. 11 gill-rakers on lower part of anterior arch. Pharyngeal teeth slender. 36 scales in a longitudinal series, 5 from origin of dorsal to lateral line. Dorsal XVII 12; last spine  $\frac{2}{3}$  head. Anal III 10; third spine stronger and nearly as long as last dorsal. Pectoral  $\frac{2}{3}$  length of head. Caudal emarginate. Caudal peduncle  $1\frac{1}{2}$  as long as deep. A dark lateral band from eye to base of caudal fin; soft dorsal with series of spots.

A single specimen (*Moore*), 190 mm. in total length.

16. *HAPLOCHROMIS STRIGATUS*, sp. n. (Text-fig. 13.)

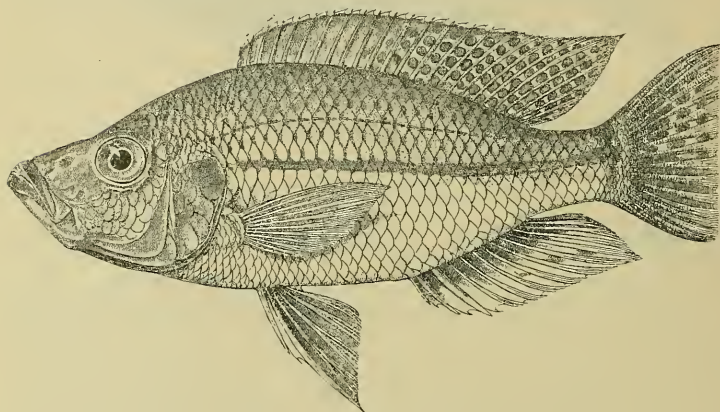
Depth of body  $2\frac{3}{5}$  to  $2\frac{1}{4}$  in length, length of head  $2\frac{1}{2}$  to 3. Snout with straight or slightly concave profile, as long as postorbital part of head. Diameter of eye 4 to  $4\frac{1}{4}$  in length of head, equal to depth of præorbital or interorbital width, less than depth of cheek.



Mouth oblique; lower jaw projecting; maxillary not extending to below eye; teeth conical, triserial, 55 to 60 in outer series of upper jaw. 3 or 4 series of scales on cheek. 12 or 13 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 33 or 34 scales in a longitudinal series, 6 from origin of dorsal to lateral line. Dorsal XV-XVI 11; last spine  $\frac{2}{3}$ , longest soft rays  $\frac{3}{5}$  to  $\frac{3}{4}$  length of head. Anal III 10-11; third spine stronger and shorter than last dorsal. Pectoral nearly as long as head, reaching anal. Caudal truncate. Caudal peduncle  $1\frac{1}{3}$  as long as deep. Silvery; a blackish stripe, half as broad as a scale, from operculum to base of caudal. Dorsal with series of orange spots; other fins yellowish (♀) or pelvics and anal blackish with red margin (♂).

Three specimens, 170 to 185 mm. in total length (*Wood*).

Text-figure 13.



*Haplochromis strigatus*.  $\frac{1}{2}$ .

17. *HAPLOCHROMIS DIMIDIATUS* Günth., 1864.

Depth of body 4 in length, length of head  $3\frac{1}{5}$ . Snout with straight upper profile, a little shorter than postorbital part of head. Diameter of eye 5 in length of head, equal to preorbital depth, slightly exceeding interorbital width. Mouth oblique; lower jaw projecting; maxillary ending far in front of eye; teeth conical, in 3 series in upper jaw, 2 in lower; 44 in outer series of upper jaw; anterior teeth of second series in upper jaw enlarged. 3 or 4 series of scales on cheek. 11 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 35 scales in a longitudinal series, 5 from origin of dorsal to lateral line. Dorsal XVI 11; last spine  $\frac{1}{3}$  length of head. Anal III 11; third spine as long as and stronger than last dorsal. Pectoral  $\frac{2}{3}$  length of head. Caudal slightly emarginate.



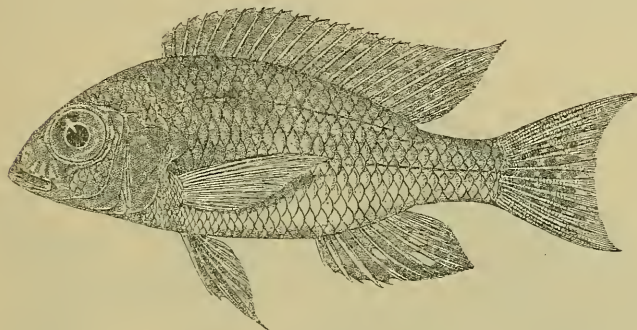
Caudal peduncle twice as long as deep. Silvery; an opercular spot; a blackish lateral stripe, half as broad as a scale, ending in a spot on base of caudal fin.

A specimen of 165 mm. (*Wood*), described above, has been compared with the type, a skin 220 mm. long.

18. *HAPLOCHROMIS AURITUS*, sp. n. (Text-fig. 14.)

Depth of body  $2\frac{4}{5}$  in length, length of head 3. Snout convex, a little shorter than diameter of eye, which is twice præorbital depth, 3 in length of head; interorbital width  $4\frac{1}{3}$  in head. Jaws equal anteriorly; maxillary extending to below eye; teeth in 2 series; 66 bicuspid teeth in outer series of upper jaw. 3 series of scales on cheek. 13 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 32 scales in a longitudinal series, 5 from origin of dorsal to lateral line. Dorsal

Text-figure 14.



*Haplochromis auritus*. Nat. size.

XV 10; last spine a little less than  $\frac{1}{2}$  length of head. Anal III 9; third spine stronger than and nearly as long as last dorsal. Pectoral as long as head, reaching anal. Caudal rather deeply emarginate. Caudal peduncle a little longer than deep. Silvery; a blackish opercular spot; a dark spot on lateral line below spinous dorsal; series of spots on soft dorsal and caudal.

A single specimen, 80 mm. in total length (*Wood*).

19. *HAPLOCHROMIS TETRASTIGMA* Günth., 1893.

*Tilapia tetrastigma* Bouleng. Cat. Afr. Fish. iii. p. 250, fig. 168.

Depth of body  $2\frac{1}{2}$  to  $2\frac{4}{5}$  in length, length of head about 3. Snout with straight or convex profile, nearly as long as post-orbital part of head. Diameter of eye  $3\frac{1}{2}$  in length of head, interorbital width 4, præorbital depth 4. Jaws equal anteriorly; maxillary not extending to below eye; teeth in 3 or 4 series, outer

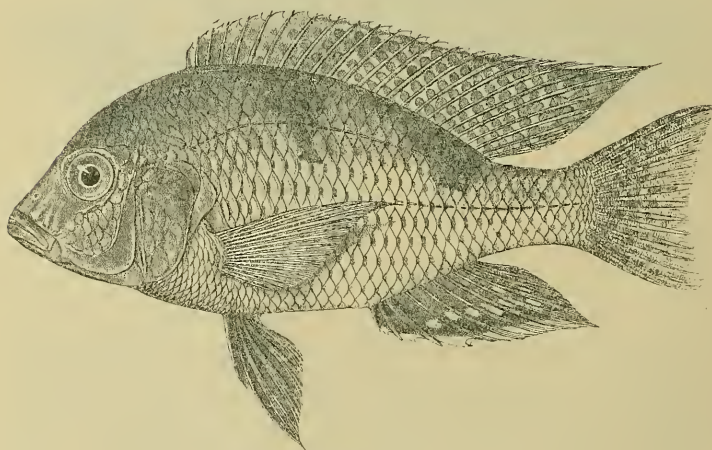
bicuspid, about 60 in outer series of upper jaw. 3 or 4 series of scales on cheek. 10 or 11 gill-rakers on lower part of anterior arch. Lower pharyngeal a small weak plate bearing small compressed bicuspid teeth. 30 to 32 scales in a longitudinal series, 5 from origin of dorsal to lateral line. Dorsal XIV-XV 10-11; last spine  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Anal III 8-9; third spine a little shorter than last dorsal. Pectoral as long as or a little shorter than head, reaching origin of anal or a little beyond. Caudal slightly emarginate. Caudal peduncle  $1\frac{1}{4}$  to  $1\frac{1}{2}$  as long as deep. Silvery; four blackish spots, the first on operculum, the second on upper lateral line below spinous dorsal, the third on side below soft dorsal, the fourth at base of caudal.

Three of the types, 105 to 110 mm. in total length.

20. *HAPLOCHROMIS PLACODON*, sp. n. (Text-fig. 15.)

Depth of body  $2\frac{1}{3}$  to  $2\frac{2}{3}$  in length, length of head about 3. Snout with straight or convex profile, shorter than postorbital part of head. Diameter of eye equal to or greater than depth

Text-figure 15.



*Haplochromis placodon*.  $\frac{1}{2}$ .

of preorbital,  $3\frac{2}{3}$  to  $4\frac{1}{4}$  in length of head, interorbital width  $3\frac{1}{5}$  to  $3\frac{2}{3}$ . Jaws equal anteriorly, lower  $\frac{3}{8}$  length of head; maxillary not extending to below eye; teeth in 4 or 5 series, outer bicuspid, 50 to 55 in outer series of upper jaw. 3 or 4 series of scales on cheek. 8 or 9 gill-rakers on lower part of anterior arch. Lower pharyngeal a large and strong plate bearing large rounded flat teeth. 31 to 33 scales in a longitudinal series, 4 or 5 from origin of dorsal to lateral line. Dorsal XVI 10-11;

last spine  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Anal III 8-9; third spine  $\frac{1}{3}$  to  $\frac{2}{5}$  head. Pectoral as long as head, extending nearly to middle of anal. Caudal emarginate. Caudal peduncle  $1\frac{2}{5}$  to  $1\frac{3}{5}$  as long as deep. Silvery; a blackish spot on operculum; two large blackish spots on upper lateral line, expanding upwards towards spinous and soft dorsal; a blackish spot at base of caudal. Dorsal and caudal with series of orange spots; males with a pale edge to dorsal and lower fins dusky, the anal with ocelli.

Five specimens, 130 to 180 mm. in total length (*Wood*).

## 21. HAPLOCHROMIS INTERMEDIUS Günth., 1864.

*Paratilapia intermedia* (part.) Bouleng. Cat. Afr. Fish. iii. p. 363.

Depth of body  $2\frac{1}{2}$  in length, length of head 3. Snout with straight profile, shorter than postorbital part of head. Diameter of orbit nearly equal to depth of præorbital, which is  $4\frac{1}{4}$  in length of head. Jaws equal anteriorly or lower perhaps slightly projecting; lower jaw  $\frac{3}{4}$  length of head; præmaxillary pedicels not reaching orbits; maxillary not extending to below eye; teeth small, conical, in 2 or 3 series, about 70 in outer series of upper jaw. 4 series of scales on cheek. 34 scales in a longitudinal series, 5 from origin of dorsal to lateral line. Dorsal XVI 11; spines strongly increasing to last, which is nearly  $\frac{1}{2}$  length of head. Anal III 9; last spine  $\frac{1}{3}$  head. Pectoral as long as head, reaching anal. Caudal rather deeply emarginate. Caudal peduncle a little longer than deep. Silvery; traces of two dark spots on upper lateral line; dorsal with series of spots and a pale edge; anal with several spots.

The type, a skin, 185 mm. long.

Boulenger's figure (Cat. Afr. Fish. iii. fig. 247) represents the body and fins correctly, but the head is inaccurate, the præorbital being too narrow; also the four black spots depicted are taken from a specimen of *H. quadrimaculatus*.

*H. intermedius* is well distinguished from *H. quadrimaculatus* by the deeper præorbital, deeper cheek with 4 series of scales, shorter præmaxillary pedicels, the number of dorsal spines (16 instead of 17 or 18), and the form of the spinous dorsal fin. It shows much closer agreement with *H. placodon*, but has the teeth in fewer series, smaller, and conical instead of cuspidate; also the lower jaw is notably longer.

## 22. HAPLOCHROMIS MODESTUS Günth., 1893.

*Paratilapia modesta* (part.) Bouleng. Cat. Afr. Fish. iii. p. 326, fig. 219.

Depth of body 3 in length, length of head  $2\frac{3}{5}$ . Snout with straight profile, as long as postorbital part of head. Diameter of eye  $4\frac{1}{3}$  in length of head, a little greater than præorbital depth, equal to depth of cheek; interorbital width 5 in length.

of head. Lower jaw projecting; end of maxillary not far short of vertical from anterior edge of eye; teeth conical, in 3 series, 70 in outer series of upper jaw. 4 series of scales on cheek. 12 gill-rakers on lower part of anterior arch. Pharyngeal teeth slender. 32 scales in a longitudinal series, 5 from origin of dorsal to lateral line. Dorsal XVI 11; last spine  $\frac{1}{3}$  length of head. Anal III 10; third spine stronger and slightly shorter than last dorsal. Pectoral? Caudal? (perhaps truncate). Caudal peduncle as long as deep. Colour?

A single specimen, 150 mm. in total length.

23. *HAPLOCHROMIS WOODI*, sp. n. (Pl. II.)

*Paratilapia modesta* (part.) Bouleng. Cat. Afr. Fish. iii. p. 326.

Depth of body  $2\frac{1}{2}$  to 3 in length, length of head  $2\frac{3}{4}$  to  $2\frac{3}{4}$ . Snout with straight profile, as long as postorbital part of head. Diameter of eye  $3\frac{1}{2}$  to 4 in length of head, equal to or greater than depth of præorbital or cheek; interorbital width 6 to 7 in head. Lower jaw projecting; maxillary not extending to below eye; teeth conical, in 3 or 4 series, 55 to 70 in outer series of upper jaw. 3 or 4 series of scales on cheek. 11 or 12 gill-rakers on lower part of anterior arch. Pharyngeal teeth slender. 32 or 33 scales in a longitudinal series, 5 or 6 from origin of dorsal to lateral line. Dorsal XV-XVI 9-10; last spine  $\frac{1}{3}$  to  $\frac{2}{5}$ , longest soft rays  $\frac{1}{2}$  to  $\frac{2}{3}$  length of head. Anal III 9-10; third spine stronger than and about as long as last dorsal. Pectoral a little shorter than head, reaching anal. Caudal truncate or slightly emarginate, angles sometimes rounded. Caudal peduncle as long as or a little longer than deep. Silvery; about 10 faint dark cross-bars; an opercular spot; a series of small dark spots near dorsal profile; a large dark spot on side below spinous dorsal, a second below soft dorsal, a third at base of caudal. Dorsal and caudal with series of orange spots; in males dorsal with blackish intramarginal band and orange edge; pelvis and anal blackish, latter with orange spots.

Six specimens, 130 to 210 mm. long (*Wood*); two in poor condition (*Rendall*) also belong to this species.

24. *HAPLOCHROMIS CHRYSONOTUS* Bouleng., 1908.

*Paratilapia chrysonota* Bouleng. Cat. Afr. Fish. iii. p. 362, fig. 246.

Depth of body  $2\frac{1}{2}$  to 3 in length, length of head 3 to  $3\frac{1}{4}$ . Snout with straight profile, as long as or a little shorter than diameter of eye, which is about twice depth of præorbital,  $2\frac{3}{4}$  to  $3\frac{1}{4}$  in length of head, interorbital width about  $3\frac{1}{2}$ . Jaws equal anteriorly; præmaxillary pedicels extending to between anterior edges of orbits,  $\frac{1}{3}$  length of head; maxillary not extending to below eye; teeth small, conical, in 3 or 4 series. 2 or 3 series of scales on cheek. 18 to 21 gill-rakers on lower part of anterior



arch. Pharyngeal teeth small. 31 to 34 scales in a longitudinal series, 5 or 6 from origin of dorsal to lateral line. Dorsal XV-XVI 9-11; last spine  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Anal III 9-11; third spine about  $\frac{2}{5}$  head. Pectoral as long as head, reaching anal. Caudal scaly, slightly emarginate. Caudal peduncle as long as or a little longer than deep. Silvery with four blackish spots, one on operculum, the second on and under lateral line below spinous dorsal, the third below soft dorsal, the fourth at base of caudal; males usually darker, often with yellow back.

Several specimens, 100 to 130 mm. long.

25. *HAPLOCHROMIS QUADRIMACULATUS*, sp. n.

*Paratilapia intermedia* (part.) Bouleng. Cat. Afr. Fish. iii. p. 363.

Depth of body  $2\frac{1}{3}$  to  $2\frac{2}{3}$  in length, length of head 3 to  $3\frac{1}{2}$ . Snout with straight profile, shorter than postorbital part of head. Diameter of eye 4 to  $4\frac{1}{2}$  in length of head, depth of præorbital 5 to  $5\frac{1}{2}$ , interorbital width  $3\frac{1}{2}$ . Jaws equal or lower slightly projecting; præmaxillary pedicels extending to between anterior edges of orbits,  $\frac{2}{5}$  length of head; maxillary not extending to below eye; teeth small, conical, in 2 or 3 series. 2 or 3 series of scales on cheek. 24 to 27 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 34 to 36 scales in a longitudinal series, 5 or 6 from origin of dorsal to lateral line. Dorsal XVII-XVIII 11-12; spines equal or slightly increasing from seventh or eighth, last  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Anal III 10-12; third spine  $\frac{1}{3}$  to  $\frac{2}{5}$  head. Pectoral as long as or shorter than head, not or barely reaching anal. Caudal scaly, emarginate. Caudal peduncle a little longer than deep. A blackish spot on operculum, a second under lateral line below spinous dorsal, usually a third between lateral lines and a fourth at base of caudal.

Seven specimens (*Rhoades, Whyte*), 170 to 200 mm. long.

26. *HAPLOCHROMIS SPHERODON*, sp. n. (Text-fig. 16.)

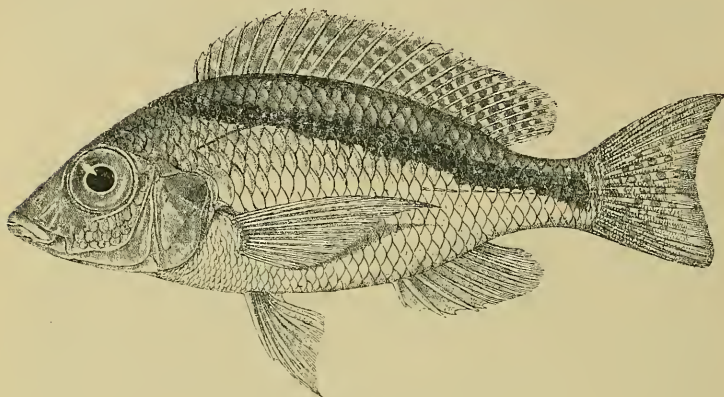
*Tilapia lateristriga* (part.) Bouleng. Cat. Afr. Fish. iii. p. 253.

Depth of body  $2\frac{2}{3}$  to 3 in length, length of head 3 to  $3\frac{1}{4}$ . Snout with straight profile, as long as or a little shorter than diameter of eye, which is 3 to  $3\frac{1}{3}$  in length of head, interorbital width 4, præorbital depth 5. Jaws equal anteriorly; maxillary not extending to below eye; teeth in 4 to 6 series, 40 to 60 bicuspid teeth in outer series of upper jaw. 2 to 4 series of scales on cheek. 9 or 10 gill-rakers on lower part of anterior arch. Middle pharyngeal teeth large, with spherical crowns. 31 or 32 scales in a longitudinal series, 5 from origin of dorsal to lateral line. Dorsal XV-XVI 10-12; last spine about  $\frac{2}{5}$  length of head. Anal III 8-9; third spine usually a little shorter than last dorsal. Pectoral about as long as head, reaching

anal. Caudal slightly emarginate. Caudal peduncle  $1\frac{1}{4}$  to  $1\frac{1}{2}$  as long as deep. An opercular spot; a blackish band from nape to caudal.

Five specimens, 80 to 125 mm. long (*Wood, Rhoades*), and a skeleton.

Text-figure 16.

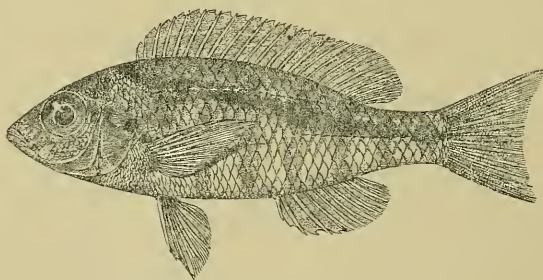


*Haplochromis sphaerodon*.  $\frac{1}{3}$ .

27. HAPLOCHROMIS ERICOTENIA, sp. n. (Text-fig. 17.)

Depth of body  $3\frac{1}{4}$  to  $3\frac{1}{2}$  in length, length of head 3 to  $3\frac{1}{3}$ . Snout with straight profile, nearly as long as or shorter than diameter of eye, which is  $2\frac{3}{4}$  to 3 in length of head, interorbital

Text-figure 17.



*Haplochromis ericotenia*. Nat. size.

width  $4\frac{1}{4}$ , præorbital depth  $5\frac{1}{2}$  to 6. Jaws equal anteriorly; maxillary not extending to below eye; teeth in 4 series, 35 bicuspid teeth in outer series of upper jaw. 3 series of scales on cheek. 10 gill-rakers on lower part of anterior arch. Middle posterior pharyngeal teeth enlarged and obtuse, probably spherical

in adult. 31 scales in a longitudinal series, 7 from origin of dorsal to lateral line. Dorsal XV-XVI 11; last spine  $\frac{2}{3}$  or a little more than  $\frac{2}{3}$  length of head. Anal III 9-10; third spine as long as last dorsal. Pectoral  $\frac{4}{5}$  head, not reaching anal. Caudal slightly emarginate. Caudal peduncle  $1\frac{2}{3}$  as long as deep. Silvery; an opercular spot; 8 faint dark cross-bars on body; a blackish band, more or less broken up into a series of spots on the bars, from nape to middle of base of caudal.

Two specimens, 65 and 72 mm. in total length (*Wood*).

28. *HAPLOCHROMIS LATERISTRIGA* Günth., 1864. (Text-fig. 18.)

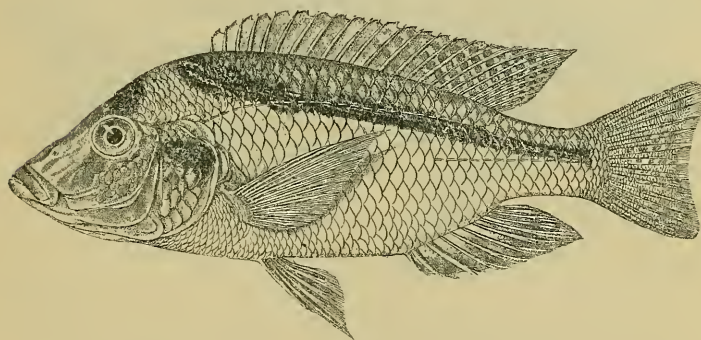
*Chromis lateristriga* (part.) Günth. P. Z. S. 1864, p. 312.

*Tilapia lateristriga* (part.) Bouleng. Cat. Afr. Fish. iii. p. 253.

*Tilapia lethrinus* (part.) Bouleng. t. c. p. 254.

Depth of body  $2\frac{3}{4}$  to 3 in length, length of head  $2\frac{3}{4}$ . Snout with straight upper profile, as long as postorbital part of head. Diameter of eye 4 to 5 in length of head, interorbital width  $3\frac{1}{2}$  to  $4\frac{1}{2}$ , depth of præorbital  $3\frac{1}{2}$  to 4. Lower jaw a little projecting;

Text-figure 18.



*Haplochromis lateristriga*.  $\frac{1}{2}$ .

maxillary exposed distally, ending below nostril; teeth in 3 or 4 series, inner small; 40 to 55 bicuspid teeth in outer series of upper jaw. Cheek with 3 to 5 series of scales. 13 gill-rakers on lower part of anterior arch. A group of large blunt teeth on posterior part of lower pharyngeal. 34 scales in a longitudinal series, 6 from origin of dorsal to lateral line. Dorsal XV-XVI 10-11; last spine  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head. Anal III 9; third spine stronger and a little shorter than last dorsal. Pectoral  $\frac{3}{4}$  or  $\frac{4}{5}$  head, nearly or quite reaching anal. Caudal densely scaled, slightly emarginate. Caudal peduncle  $1\frac{1}{2}$  as long as deep. A blackish band from in front of dorsal fin to upper part of base of caudal; an opercular spot; dorsal and caudal spotted.

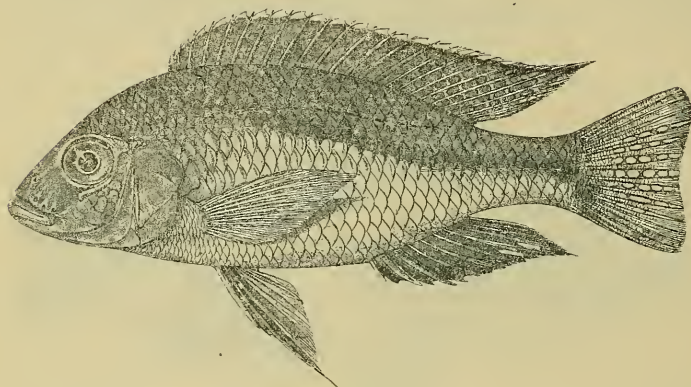
Three specimens: the type, a skin 160 mm. long, a specimen of 185 mm. (*Wood*), and another of 100 mm. (*Rhoades*).

29. *HAPLOCHROMIS PLAGIOTÆNIA*, sp. n. (Text-fig. 19.)

*Tilapia lateristriga* (part.) Bouleng. Cat. Afr. Fish. iii. p. 253.

Depth of body  $2\frac{2}{3}$  to  $3\frac{1}{2}$  in length, length of head 3 to  $3\frac{1}{4}$ . Snout with straight or slightly convex profile, as long as or a little longer than diameter of eye, which is 3 to 4 in length of head, greater than præorbital depth, equal to or greater than depth of cheek; interorbital width  $3\frac{1}{4}$  to  $3\frac{3}{4}$  in head. Jaws equal anteriorly; maxillary not extending to below eye; teeth in 2 to 4 series; 35 to 50 bicuspid teeth in outer series of upper jaw. 3 or 4 series of scales on cheek. 8 to 11 gill-rakers on lower part of anterior arch. Pharyngeal teeth small, compressed, those of the series on each side of middle line a little enlarged. 31 to 33 scales in a longitudinal series, 5 or 6 from origin of dorsal to lateral line. Dorsal XV-XVI 10-11; last spine about  $\frac{1}{2}$  length

Text-figure 19.

*Haplochromis plagiotaenia.*  $\frac{6}{7}$ .

of head. Anal III 8-9; third spine  $\frac{2}{5}$  to  $\frac{1}{2}$  head. Soft dorsal; anal, and pelvic fins produced in males. Pectoral as long as or a little shorter than head, nearly or quite reaching anal. Caudal slightly emarginate. Caudal peduncle longer than deep. A dark band from nape to middle of base of caudal; dorsal and caudal usually with series of spots; males darker in colour, with dark fins, the dorsal with a pale edge.

17 specimens, 70 to 110 mm. in total length (*Rhoades, Wood*), all but one with 15 dorsal spines.

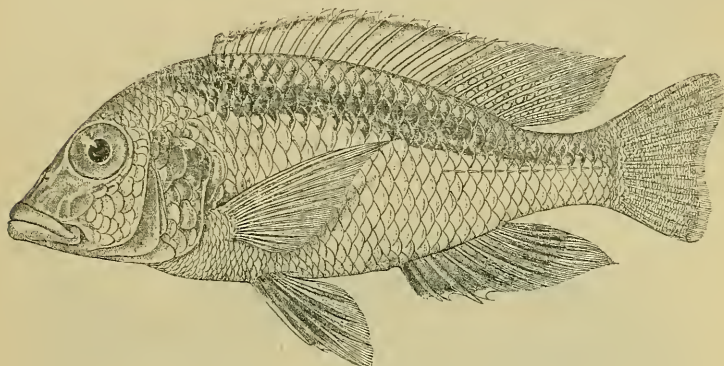
30. *HAPLOCHROMIS MELANOTÆNIA*, sp. n. (Text-fig. 20.)

Depth of body  $2\frac{2}{3}$  to  $2\frac{3}{4}$  in length, length of head  $2\frac{3}{4}$  to 3. Snout straight, declivous, nearly as long as or a little longer than diameter of eye, which is 3 to  $3\frac{1}{2}$  in length of head, equal to or greater than interorbital width, greater than præorbital depth,



not less than depth of cheek. Jaws equal anteriorly; maxillary extending to below anterior edge of eye; lips thick; teeth in 4 or 5 well-separated series, conical, or outer bicuspid and inner tricuspid in young, 40 to 50 in outer series of upper jaw. 3 or 4 series of scales on cheek. 9 or 10 gill-rakers on lower part of anterior arch. Lower pharyngeal stout; middle teeth conical or slightly compressed, moderately strong, set well apart, only 8 in the series on each side of middle line. 33 scales in a longitudinal series, 5 from origin of dorsal to lateral line. Dorsal XV-XVII 10-11; last spine about  $\frac{2}{5}$  length of head. Anal III 9; third spine stronger than dorsals,  $\frac{1}{3}$  to  $\frac{2}{5}$  head. Pectoral as long as

Text-figure 20.

*Haplochromis melanotania*.  $\frac{1}{2}$ .

head, reaching anal. Caudal truncate or slightly emarginate. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{2}{3}$  as long as deep. An opercular spot; a blackish band from nape to caudal; series of orange spots on dorsal.

Three specimens, 120 to 170 mm. in total length (Wood).

### 31. *HAPLOCHROMIS GUENTHERI*, sp. n.

*Chromis lateristriga* (part.) Günth. P. Z. S. 1864, p. 312.

*Tilapia lateristriga* (part.) Bouleng. Cat. Afr. Fish. iii. p. 253, fig. 170.

*Paratilapia dimidiata* (part.) Bouleng. t. c. p. 360.

Depth of body  $2\frac{1}{2}$  to 3 in length, length of head  $3\frac{1}{3}$  to  $3\frac{1}{2}$ . Snout with straight or slightly convex profile, shorter than post-orbital part of head. Diameter of eye  $3\frac{1}{2}$  to 5 in length of head, greater (young) or less (adult) than depth of preorbital, less than depth of cheek; interorbital width about 4 in length of head. Lower jaw a little shorter than upper; maxillary not extending to below eye; teeth in 3 or 4 series, outer bicuspid in young, conical in adult, 40 to 70 in outer series of upper jaw; anterior outer teeth of lower jaw directed outwards. 3 or 4 series of

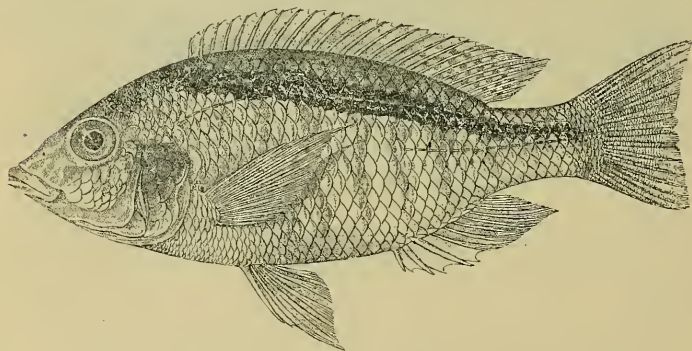
scales on cheek. 13 or 14 gill-rakers on lower part of anterior arch. Pharyngeal teeth small, none enlarged. 33 to 35 scales in a longitudinal series, 5 from origin of dorsal to lateral line. Dorsal XVI-XVII 10-12; last spine  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Anal III 8-10; third spine stronger and shorter than last dorsal. Pectoral as long as head, usually not reaching anal. Caudal slightly emarginate. Caudal peduncle longer than deep. Silvery; an opercular spot; a blackish band from nape to caudal; usually a series of dark spots at base of dorsal; series of orange spots on dorsal fin.

Seven specimens of 130 to 190 mm. (Wood), the one figured by Boulenger (*Rhoades*), and one of the types of *C. lateristriga* a skin 245 mm. long.

### 32. HAPLOCHROMIS MELANONOTUS, sp. n. (Text-fig. 21.)

Depth of body  $2\frac{3}{5}$  to 3 in length, length of head  $3\frac{1}{4}$ . Profile of head evenly decurved. Snout  $\frac{7}{8}$  to  $1\frac{1}{3}$  diameter of eye, which is 3 to  $3\frac{3}{4}$  in length of head, greater than depth of præorbital

Text-figure 21.



*Haplochromis melanonotus*.  $\frac{3}{4}$ .

or cheek; interorbital width  $3\frac{1}{4}$  to 4 in head. Jaws equal anteriorly; maxillary not extending to below eye; teeth in 4 or 5 series; 40 to 60 bicuspid teeth in outer series of upper jaw. 4 series of scales on cheek. 12 gill-rakers on lower part of anterior arch. Pharyngeal teeth small, none enlarged. 34-35 scales in a longitudinal series, 6 from origin of dorsal to lateral line. Dorsal XVIII-XIX 10; last spine  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head, longest soft rays  $\frac{1}{2}$  head. Anal III 10; third spine from less than  $\frac{3}{8}$  to more than  $\frac{2}{5}$  head. Pectoral as long as or a little shorter than head, nearly or quite reaching anal. Caudal slightly emarginate. Caudal peduncle  $1\frac{1}{2}$  as long as deep. Silvery; a blackish band from nape to upper half of base of caudal.

Two specimens, 85 and 200 mm. in total length (Wood).

33. *HAPLOCHROMIS BREVIS* Bouleng., 1908.*Tilapia brevis* Bouleng. Cat. Afr. Fish. iii. p. 262, fig. 177.

Depth of body  $2\frac{1}{2}$  in length, length of head  $2\frac{2}{3}$ . Snout convex, shorter than diameter of eye, which is twice præorbital depth,  $2\frac{1}{2}$  to  $2\frac{2}{3}$  in length of head; interorbital width 4 in head. Jaws equal anteriorly; maxillary extending to below anterior edge of eye; teeth in 2 or 3 series; 65 to 80 bicuspid teeth in outer series of upper jaw. 3 series of scales on cheek. 8 or 9 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 31 scales in a longitudinal series, 6 from origin of dorsal to lateral line. Dorsal XV 12; last spine a little less than  $\frac{1}{2}$  length of head. Anal III 9; third spine stronger than dorsals,  $\frac{5}{8}$  head. Pectoral as long as head, reaching anal. Caudal emarginate. Caudal peduncle as long as deep. Silvery; an opercular spot; a dark band from nape to base of caudal.

Two specimens, 70 and 75 mm. in total length.

34. *HAPLOCHROMIS NOTOTÆNIA* Bouleng., 1902.*Paratilapia nototænia* Bouleng. Cat. Afr. Fish. iii. p. 359.

Depth of body  $2\frac{2}{3}$  to 3 in length, length of head  $2\frac{3}{4}$  to 3. Snout decurved, shorter than postorbital part of head. Diameter of eye  $3\frac{3}{4}$  to  $4\frac{1}{2}$  in length of head, interorbital width  $3\frac{1}{2}$  to  $3\frac{1}{2}$ , præorbital depth 4 to  $4\frac{1}{2}$ . Jaws equal anteriorly; maxillary extending to below anterior margin of eye; teeth in 3 to 5 series, outer bicuspid in young, conical in adult, 75 to 90 in outer series of upper jaw. 3 series of scales on cheek. 12 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 35 or 36 scales in a longitudinal series, 6 from origin of dorsal to lateral line. Dorsal XVI-XVII 10-12; last spine  $\frac{1}{3}$  length of head. Anal III 9-10; third spine  $\frac{1}{4}$  to  $\frac{2}{5}$  head. Pectoral a little shorter than head, reaching origin of anal. Caudal emarginate. Caudal peduncle  $1\frac{1}{2}$  as long as deep. An opercular spot; a blackish band on each side of back from origin of dorsal to caudal; dorsal and caudal with bars or series of spots; lower fins tinged with orange.

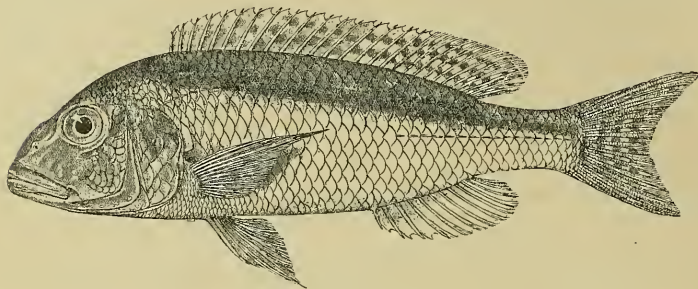
The type and three specimens of 180 to 250 mm. (Wood).

35. *HAPLOCHROMIS LEPTURUS*, sp. n. (Text-fig. 22.)*Paratilapia rhoadesii* (part.) Bouleng. Cat. Afr. Fish. iii. p. 361.

Depth of body  $3\frac{1}{5}$  to  $3\frac{2}{5}$  in length, length of head 3 to  $3\frac{1}{2}$ . Snout decurved, a little shorter than postorbital part of head. Diameter of eye  $4\frac{1}{3}$  to 6 in length of head, interorbital width  $3\frac{2}{3}$  to 4, depth of præorbital 4 to  $4\frac{1}{3}$ . Jaws equal anteriorly; maxillary extending to vertical from anterior edge of eye; teeth conical, in 3 to 6 series, 70 to 90 in outer series of upper jaw. 4 or 5 series of scales on cheek. 11 to 13 gill-rakers on lower part of anterior arch. Pharyngeal teeth small, 37 to 39 scales in a longitudinal series, 6 or 7 from origin of

dorsal to lateral line. Dorsal XVII 11-13; last spine from a little less than  $\frac{1}{3}$  to nearly  $\frac{2}{3}$  length of head. Anal III 10-11; third spine stronger and a little shorter than last dorsal. Pectoral  $\frac{3}{4}$  to  $\frac{7}{8}$  length of head, not reaching anal. Caudal emarginate. Caudal peduncle  $1\frac{2}{3}$  to 2 as long as deep. Silvery; back darker;

Text-figure 22.

*Haplochromis lepturus.*  $\frac{4}{5}$ .

an opercular spot; a dark band from origin of dorsal to caudal (absent in the largest specimen, which is darker than the others); series of spots on dorsal.

Five specimens of 170 to 240 mm. (*Wood*) and one of 360 mm. (*Rhoades*).

### 36. HAPLOCHROMIS RHOADESII Bouleng., 1908.

*Paratilapia rhoadesii* (part.) Bouleng. Cat. Afr. Fish. iii. p. 361, fig. 245.

Depth of body  $2\frac{3}{5}$  to 3 (adult) or  $3\frac{2}{5}$  (young) in the length, length of head  $2\frac{1}{5}$  to 3. Snout decurved, as long as postorbital part of head. Diameter of eye 4 to  $5\frac{1}{2}$  in length of head, interorbital width 4 to  $4\frac{1}{2}$ , depth of præorbital  $3\frac{1}{2}$  to  $4\frac{1}{2}$ . Lower jaw usually a little projecting; maxillary not extending to below eye; teeth cuspidate in young, conical in adult, in 3 to 5 series, 60 to 80 in outer series of upper jaw. 4 or 5 series of scales on cheek. 11 or 12 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 35 to 37 scales in a longitudinal series, 5 to 7 from origin of dorsal to lateral line. Dorsal XV-XVII 11-13; spines equal or slightly increasing from sixth or seventh, last  $\frac{1}{4}$  to  $\frac{1}{3}$  length of head. Anal III 10; third spine stronger than dorsals,  $\frac{1}{4}$  to  $\frac{1}{3}$  head. Pectoral  $\frac{3}{4}$  to  $\frac{7}{8}$  head, reaching vent or origin of anal. Caudal emarginate. Caudal peduncle  $1\frac{1}{2}$  to  $1\frac{2}{3}$  as long as deep. An opercular spot; body with or without faint dark cross-bars; a blackish band from nape to caudal; dorsal with series of spots.

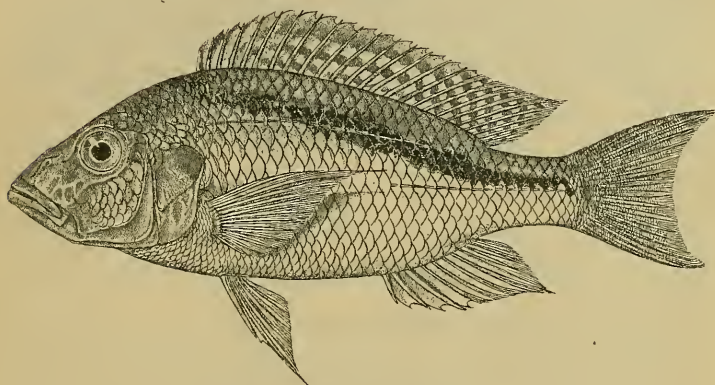
The type (250 mm.) and a series of specimens 120 to 250 mm. long (*Wood*).



37. *HAPLOCHROMIS ATRITÆNIATUS*, sp. n. (Text-fig. 23.)

Depth of body  $2\frac{2}{3}$  in length, length of head 3. Snout with straight profile, nearly as long as postorbital part of head. Diameter of eye 4 to  $4\frac{1}{2}$  in length of head, interorbital width 4, depth of præorbital 4 to  $4\frac{1}{2}$ . Lower jaw slightly projecting; maxillary not quite reaching vertical from anterior edge of eye; teeth in 3 series, outer bicuspid or some conical, 70 in outer series of upper jaw. 4 series of scales on cheek. 11 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 33 or 34 scales in a longitudinal series, 6 or 7 from origin of dorsal to lateral line. Dorsal XVI 10-11; spines equal or slightly increasing from the sixth, last  $\frac{2}{5}$  or a little more than  $\frac{2}{5}$  length of head.

Text-figure 23.

*Haplochromis atritæniatus*.  $\frac{1}{2}$ .

Anal III 9; third spine  $\frac{1}{3}$  head. Pectoral as long as head, extending a little beyond origin of anal. Caudal emarginate. Caudal peduncle  $1\frac{1}{2}$  to  $1\frac{2}{3}$  as long as deep. An opercular spot; a blackish band from nape to caudal; dorsal and caudal with series of spots.

Two specimens, 150 and 170 mm. long (Wood).

38. *HAPLOCHROMIS SPILORHYNCHUS*, sp. n. (Pl. VI. fig. 2.)

*Paratilapia dimidiata* (part.) Bouleng. Cat. Afr. Fish. iii. p. 360.

Depth of body  $3\frac{1}{5}$  to  $3\frac{3}{5}$  in length, length of head about 3. Snout decurved, as long as postorbital part of head. Diameter of eye  $4\frac{2}{3}$  to  $5\frac{1}{2}$  in length of head, less than depth of præorbital or cheek; interorbital width  $4\frac{2}{3}$  to  $5\frac{1}{2}$  in length of head. Lower jaw a little projecting; maxillary not extending to below eye; teeth conical, in 3 or 4 series, outer strong and spaced, 25 to 40 in upper jaw. 5 or 6 series of scales on cheek. 10 or 11 gill-

rakers on lower part of anterior arch. Pharyngeal teeth slender. 36 scales in a longitudinal series, 6 or 7 from origin of dorsal to lateral line. Dorsal XVI 12; last spine  $\frac{1}{3}$  length of head. Anal III 9-10; third spine as long as and stronger than last dorsal. Pectoral  $\frac{3}{4}$  to  $\frac{4}{5}$  head, not reaching anal. Caudal emarginate. Caudal peduncle  $1\frac{2}{3}$  as long as deep. A large black spot on præorbital; an opercular spot; a blackish band on each side of back from origin of dorsal to caudal.

Seven specimens (*Wood, Rhoades, Rendall*) 150-240 mm. in total length.

39. *HAPLOCHROMIS LONGIPES*, sp. n. (Pl. V. fig. 2.)

Depth of body  $3\frac{1}{2}$  in length, length of head 3. Snout decurved, twice as long as diameter of eye, which is  $5\frac{1}{2}$  in length of head, less than depth of præorbital or cheek; interorbital width  $4\frac{2}{3}$  in length of head. Lower jaw a little projecting; maxillary not quite reaching vertical from anterior edge of eye. Teeth conical, in 3 series, outer rather strong, 45 in upper jaw. 5 series of scales on cheek; 13 gill-rakers on lower part of anterior arch. Pharyngeal teeth slender. 37 scales in a longitudinal series, 6 from origin of dorsal to lateral line. Dorsal XVI 12; spines strongly increasing to last, which is  $\frac{2}{3}$  length of head. Anal III 10; third spine  $\frac{2}{7}$  length of head. Soft dorsal and anal produced, pointed. Pectoral  $\frac{3}{4}$  length of head; pelvics as long as head. Caudal emarginate. Caudal peduncle  $1\frac{1}{2}$  as long as deep. An opercular spot; a blackish band on each side of back from nape to base of caudal.

A single specimen, 260 mm. in total length.

40. *HAPLOCHROMIS CÆRULEUS* Bouleng., 1908.

*Champsocromis cæruleus* Bouleng. Cat. Afr. Fish. iii. p. 433, fig. 295.

Closely related to the preceding, differing as follows:—Depth of body 4 in length, head  $3\frac{1}{4}$ . Snout  $2\frac{1}{2}$  diameter of eye, which is 6 in length of head. Interorbital width 4 in head. Maxillary not nearly reaching vertical from anterior edge of eye. 11 gill-rakers on lower part of anterior arch. Caudal peduncle twice as long as deep.

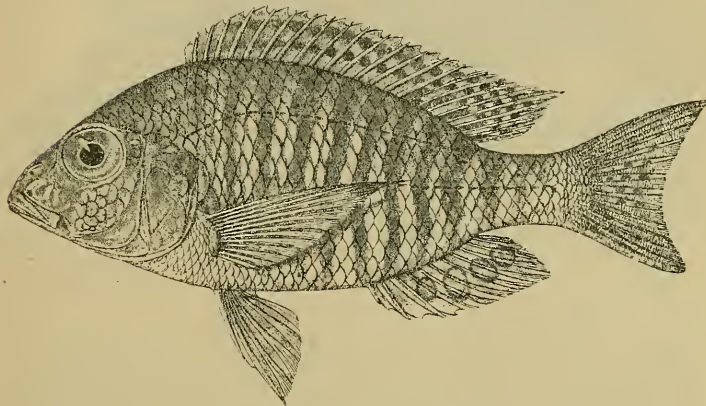
Total length 255 mm.

41. *HAPLOCHROMIS MACROCHIR*, sp. n. (Text-fig. 24.)

Depth of body  $2\frac{2}{3}$  in length, length of head nearly 3. Snout with straight or slightly convex profile, as long as diameter of eye, which is  $3\frac{1}{4}$  in length of head,  $1\frac{1}{3}$  depth of præorbital or cheek; interorbital width 4 to  $4\frac{1}{3}$  in head. Jaws equal anteriorly; maxillary extending to vertical from anterior edge of eye; teeth very small, in 2 or 3 series, outer bicuspid, about 80 in outer series of upper jaw; 4 series of scales on

cheek. 13 or 14 gill-rakers on lower part of anterior arch. A group of enlarged teeth with spherical crowns on posterior half of lower pharyngeal. 33 scales in a longitudinal series, 6 from origin of dorsal to lateral line. Dorsal XVI 10; last spine  $\frac{2}{5}$  to  $\frac{1}{2}$ , longest soft rays  $\frac{2}{3}$  to  $\frac{4}{5}$  length of head. Anal III 9; third spine  $\frac{1}{3}$  to  $\frac{2}{5}$  head. Pectoral longer than head, reaching middle of anal. Caudal emarginate. Caudal peduncle longer than deep. Silvery;

Text-figure 24.

*Haplochromis macrochir.*  $\frac{2}{3}$ .

an opercular spot; about 10 faint dark cross-bars; dorsal and caudal with series of spots; anal, in male, with several ocelli.

Two specimens, 115 and 130 mm. long (Wood).

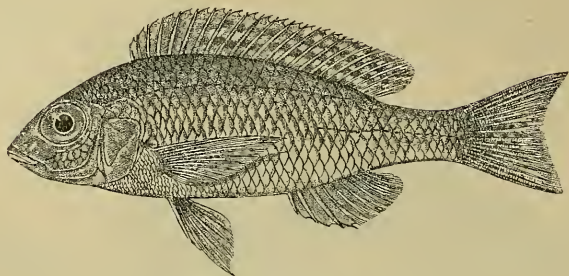
42. *HAPLOCHROMIS ARGYROSOMA*, sp. n. (Text-fig. 25.)

*Tilapia macrophthalmus* (part.) Bouleng. Cat. Afr. Fish. iii. p. 261.

Depth of body equal to length of head,  $3\frac{1}{2}$  in length of fish. Snout decurved, shorter than diameter of eye, which is 3 in length of head, twice depth of preorbital or cheek; interorbital width 5 in length of head. Jaws equal anteriorly; maxillary extending to below anterior edge of eye; teeth in 2 or 3 series, 50 in outer series of upper jaw, mostly bicuspid, but the last few on each side conical; 2 series of scales on cheek. 11 gill-rakers on lower part of anterior arch. Last few teeth of two middle series of lower pharyngeal enlarged. 33 scales in a longitudinal series, 5 from origin of dorsal to lateral line. Dorsal XVII 10; last spine nearly  $\frac{1}{2}$  length of head. Anal III 9; third spine less than  $\frac{2}{5}$  head. Pectoral as long as head, reaching anal. Caudal emarginate. Caudal peduncle  $1\frac{1}{2}$  as long as deep. Silvery; dorsal and caudal with series of spots.

A single specimen, one of the types of *T. macrophthalmus*, 75 mm. in total length.

Text-figure 25.



*Haplochromis argyrosoma*. Nat. size.

43. *HAPLOCHROMIS MACROPHthalmus* Bouleng., 1908.

*Tilapia macrophthalmus* (part.) Bouleng. Cat. Afr. Fish. iii. p. 261, fig. 176.

Depth of body  $2\frac{2}{3}$  to 3 in length, length of head 3. Snout with slightly convex profile, shorter than diameter of eye, which is  $2\frac{1}{2}$  in length of head, twice depth of præorbital or cheek, or interorbital width. Lower jaw a little shorter than upper; maxillary not extending to below eye; teeth in 2 series, 50 or 60 bicuspid teeth in outer series of upper jaw, anterior outer teeth of lower jaw directed outwards. 2 series of scales on cheek. 12 or 13 gill-rakers on lower part of anterior arch. Last few teeth of 2 middle series of lower pharyngeal a little enlarged. 32 or 33 scales in a longitudinal series, 5 from origin of dorsal to lateral line. Dorsal XVI 10; last spine nearly  $\frac{1}{2}$  length of head. Anal III 8; third spine as long as last dorsal. Pectoral a little longer than head, extending to above anal. Caudal emarginate. Caudal peduncle  $1\frac{1}{3}$  as long as deep. Silvery.

Four specimens, 70 to 80 mm. in total length (*Rhoades*).

44. *HAPLOCHROMIS LEUCISCUS*, sp. n. (Text-fig. 26.)

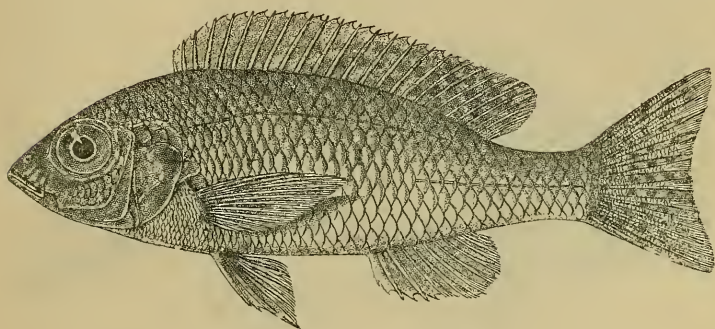
Depth of body  $3\frac{1}{4}$  to  $3\frac{1}{3}$  in length, length of head  $3\frac{1}{4}$  to  $3\frac{1}{3}$ . Snout with straight or slightly convex profile, a little shorter than diameter of eye, which is 3 in length of head, twice præorbital depth; interorbital width  $4\frac{1}{3}$  in head. Jaws equal anteriorly; maxillary not extending to below eye; teeth in 2 or 3 series; 45 bicuspid teeth in outer series of upper jaw. 2 or 3 series of scales on cheek. 11 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 31 to 33 scales in a longitudinal series, 5 or 6 from origin of dorsal to lateral line. Dorsal XVI-XVII 11; last spine  $\frac{2}{3}$  length of head. Anal III 9; third spine



stronger and as long as or a little shorter than last dorsal. Pectoral  $\frac{4}{5}$  to  $\frac{7}{8}$  head, not reaching anal. Caudal emarginate. Caudal peduncle  $1\frac{1}{2}$  as long as deep. Silvery; dorsal and caudal with series of spots.

Two specimens, 75 and 80 mm. long (*Rhoades, Wood*).

Text-figure 26.



*Haplochromis leuciscus*. Nat. size.

45. *HAPLOCHROMIS INORNATUS* Bouleng., 1908.

*Tilapia inornata* Bouleng. Cat. Afr. Fish. iii. p. 263, fig. 178.

Depth of body  $3\frac{1}{4}$  to  $3\frac{1}{2}$  in length, length of head  $3\frac{1}{4}$ . Snout shorter than diameter of eye, which is  $2\frac{3}{4}$  to 3 in length of head and twice depth of præorbital or cheek; interorbital width  $4\frac{1}{4}$  in length of head. Jaws equal anteriorly; maxillary not extending to below eye; teeth small, in 3 series; 50 bicuspid teeth in outer series of upper jaw. 2 or 3 series of scales on cheek. 15 or 16 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 34 to 36 scales in a longitudinal series, 5 from origin of dorsal to lateral line. Dorsal XVI-XVIII 11-12; last spine  $\frac{2}{3}$  length of head. Anal III 9; third spine nearly as long as last dorsal. Pectoral as long as head, not reaching anal. Caudal emarginate. Caudal peduncle  $1\frac{2}{3}$  as long as deep. Silvery.

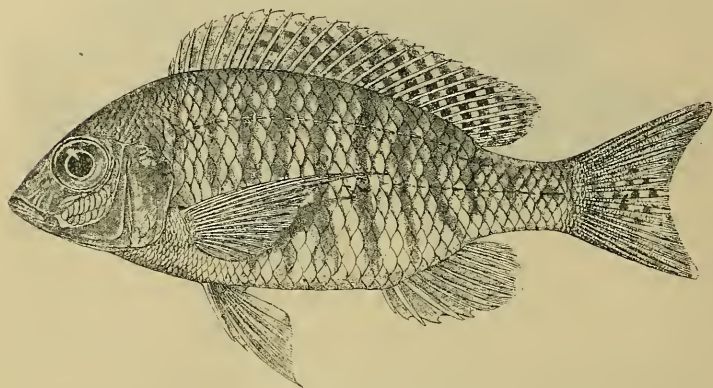
Two specimens, 85 and 95 mm. in total length (*Rhoades*).

46. *HAPLOCHROMIS MICRENTODON*, sp. n. (Text-fig. 27.)

Depth of body  $2\frac{1}{2}$  to  $2\frac{2}{3}$  in length, length of head  $3\frac{1}{4}$  to  $3\frac{1}{3}$ . Snout with slightly convex profile, a little shorter than diameter of eye, which is 3 in length of head,  $1\frac{2}{3}$  præorbital depth,  $1\frac{1}{2}$  depth of cheek; interorbital width 4 in length of head. Lower jaw a little shorter than upper; maxillary not extending to below eye; teeth in 2 or 3 series, outer bicuspid, about 70 in upper jaw; inner teeth of lower jaw minute, almost invisible, outer anterior teeth directed outwards. 2 or 3 series of scales

on cheek. 16 or 17 gill-rakers on lower part of anterior arch. Pharyngeal teeth very small. 33 scales in a longitudinal series, 5 from origin of dorsal to lateral line. Dorsal XVI 10-11; last spine  $\frac{2}{5}$  to  $\frac{1}{2}$ , longest soft rays  $\frac{1}{2}$  to  $\frac{3}{5}$  length of head. Anal III 8-9; third spine a little shorter than last dorsal. Pectoral longer than head, extending beyond origin of anal. Caudal

Text-figure 27.

*Haplochromis micrentodon*.  $\frac{5}{4}$ .

emarginate. Caudal peduncle longer than deep. Silvery, with traces of several dark cross-bars; dorsal and caudal with series of spots.

Two specimens, 110 and 115 mm. long (*Wood*).

47. *HAPLOCHROMIS EUCINOSTOMUS*, sp. n. (Pl. IV. fig. 1.)

Depth of body  $3\frac{1}{3}$  to  $3\frac{1}{2}$  in length, length of head  $3\frac{1}{3}$ . Snout with straight profile, as long as diameter of eye, which is  $3\frac{1}{3}$  in length of head, much greater than preorbital depth; inter-orbital width  $3\frac{1}{4}$  to  $3\frac{1}{2}$  in length of head. Mouth small, oblique; jaws equal anteriorly: premaxillary pedicels extending to between middle of orbits,  $\frac{2}{5}$  length of head; maxillary not extending to below eye; teeth small, in 2 or 3 series, outer bicuspids. 3 series of scales on cheek. 16 or 17 gill-rakers on lower part of anterior arch. Pharyngeal teeth small, slender. 35 scales in a longitudinal series, 5 from origin of dorsal to lateral line. Dorsal XVI-XVII 11-12; last spine  $\frac{2}{5}$  length of head. Anal III 10; third spine stronger than dorsals,  $\frac{1}{3}$  head. Pectoral a little shorter than head, not reaching anal. Caudal emarginate, densely scaled in basal half. Caudal peduncle  $1\frac{1}{2}$  as long as deep. Silvery, with traces of dark cross-bars.

Two specimens, 85 and 100 mm. long (*Wood*), the smaller (? ♂) much darker in colour than the larger.

48. *HAPLOCHROMIS PRÆORBITALIS*, sp. n. (Pl. III.)

Depth of body  $2\frac{2}{3}$  to  $2\frac{3}{4}$  in length, length of head  $2\frac{3}{4}$ -3. Snout longer than postorbital part of head; upper profile straight, obliquely descending. Diameter of eye 5 in length of head, interorbital width  $4\frac{1}{2}$ , depth of præorbital 3. Lower jaw projecting; maxillary ending not far behind nostril; teeth in 3 series in upper jaw, 4 in lower, outer bicuspid, about 70 in upper jaw. 4 series of scales on cheek. 9 or 10 gill-rakers on lower part of anterior arch. Pharyngeal teeth small, slender. 35 or 36 scales in a longitudinal series, 6 from origin of dorsal to lateral line. Dorsal XV-XVI 12-13; last spine  $\frac{2}{5}$  or  $\frac{1}{2}$  length of head; longest soft rays  $\frac{3}{5}$  or  $\frac{3}{4}$  head. Anal III 10-11; third spine stronger than dorsals,  $\frac{2}{7}$  or  $\frac{1}{5}$  head. Pectoral a little shorter than head, reaching anal. Caudal emarginaté. Caudal peduncle  $1\frac{1}{2}$  as long as deep. Greyish; an opercular spot; dorsal with oblique stripes or series of spots.

Two specimens, 210 and 240 mm. in total length (Wood). The larger has the dorsal fin higher than the other and the lower fins dusky; it is probably a male.

49. *HAPLOCHROMIS COMPRESSICEPS* Bouleng., 1908.

*Paratilapia compressiceps* Bouleng. Cat. Afr. Fish. iii. p. 331, fig. 222.

Depth of body 3 in length, length of head  $2\frac{3}{5}$  to  $2\frac{3}{4}$ . Head 4 times as long as broad; snout a little concave in front of eye, thence straight, longer than postorbital part of head. Diameter of eye  $5\frac{1}{2}$  to 6 in length of head, equal to interorbital width, from a little more than  $\frac{1}{2}$  to nearly  $\frac{2}{3}$  depth of præorbital. Lower jaw projecting; chin deep; maxillary ending a little behind nostril; teeth conical, in 3 series. 3 or 4 series of scales on cheek. 11 to 13 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 33 to 35 scales in a longitudinal series, 5 or 6 from origin of dorsal to lateral line. Dorsal XV-XVI 11-13; last spine  $\frac{1}{3}$  length of head. Anal III 10-11; third spine as long as last dorsal. Caudal scaly, truncate. Caudal peduncle  $1\frac{1}{2}$  to  $1\frac{3}{4}$  as long as deep. Silvery; three yellow-green bands, one along upper outline of head and body, the second above upper lateral line, the third along middle of side.

The type, 160 mm. long, and 3 specimens of 180-200 mm. (Wood).

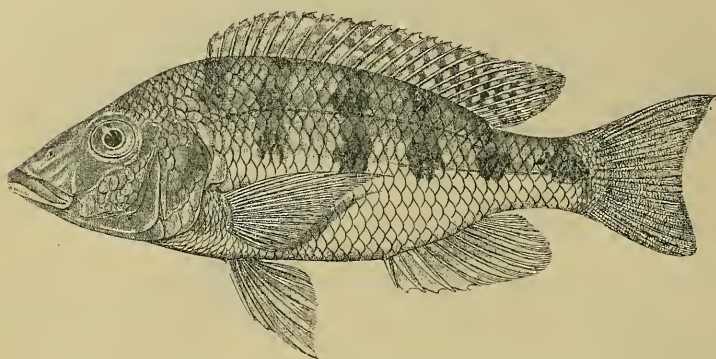
50. *HAPLOCHROMIS MACRORHYNCHUS*, sp. n. (Text-fig. 28.)

*Tilapia rostrata* (part.) Bouleng. Cat. Afr. Fish. iii. p. 255.

Depth of body  $2\frac{2}{3}$  to  $2\frac{3}{4}$  in length, length of head  $2\frac{2}{3}$  to  $2\frac{3}{4}$ . Snout with straight or convex profile, longer than postorbital part of head. Diameter of eye 5 to  $5\frac{1}{2}$  in length of head, interorbital width  $3\frac{1}{4}$  to  $3\frac{1}{2}$ , depth of præorbital  $3\frac{2}{3}$  to 4. Jaws equal anteriorly; maxillary not extending to below eye; teeth in 4 or

5 series, outer bicuspid or posteriorly unicuspid, about 70 in outer series of upper jaw. 3 or 4 series of scales on cheek. Gill-rakers rather long, 15 to 17 on lower part of anterior arch. Pharyngeal teeth small. 34 or 35 scales in a longitudinal series, 6 or 7 from origin of dorsal to lateral line. Dorsal XV-XVI 11; last spine  $\frac{1}{3}$  length of head. Anal III 9; third spine  $\frac{1}{4}$  length of head. Pectoral  $\frac{3}{4}$  length of head, nearly or quite reaching anal. Caudal emarginate. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  as long as deep.

Text-figure 28.

*Haplochromis macrorhynchus*.  $\frac{1}{2}$ .

Upper half of body with 6 dark cross-bars broken up into 3 series of spots, the first of the lowest series on operculum, the sixth at base of caudal; dorsal with series of spots.

Three specimens, 190 to 210 mm. long (*d*, *Mc*, *Moore*).

51. *HAPLOCHROMIS ROSTRATUS* Bouleng., 1899.

*Tilapia rostrata* (part.) Bouleng. Cat. Afr. Fish. iii. p. 255, fig. 172.

Depth of body  $3\frac{1}{4}$  in length, length of head  $2\frac{2}{3}$ . Snout with convex profile, longer than postorbital part of head. Diameter of eye 4 in length of head, interorbital width  $4\frac{1}{2}$ , depth of preorbital  $4\frac{1}{2}$ . Jaws equal anteriorly; maxillary not extending to below eye; teeth in 3 well-separated series, outer bicuspid, 54 in outer series of upper jaw. 3 series of scales on cheek. Gill-rakers short, 19 or 20 on lower part of anterior arch. Pharyngeal teeth small. 34 scales in a longitudinal series, 6 or 7 from origin of dorsal to lateral line. Dorsal XVI 12; last spine nearly  $\frac{2}{5}$  length of head. Anal III 10; third spine  $\frac{1}{3}$  length of head. Pectoral? Caudal emarginate. Caudal peduncle  $1\frac{1}{2}$  as long as deep. Colour nearly as in *H. macrorhynchus*, but the posterior bars more oblique and the fins unspotted.

The type, 105 mm. long.



52. *HAPLOCHROMIS MACROSTOMA*, sp. n. (Pl. IV. fig. 2.)

Depth of body 3 in length, length of head  $2\frac{3}{4}$ . Snout with profile a little concave in front of eye, thence straight, declivous,  $2\frac{1}{2}$  as long as diameter of eye, which is  $5\frac{1}{2}$  in length of head, less than præorbital depth,  $\frac{2}{3}$  depth of cheek; interorbital width  $4\frac{1}{2}$  in length of head. Jaws equal anteriorly; maxillary considerably exposed distally, extending to below anterior  $\frac{1}{3}$  of eye; teeth small, conical, in 6 series. 6 series of scales on cheek. 12 gill-rakers on lower part of anterior arch. Pharyngeal teeth slender. 35 scales in a longitudinal series, 6 from origin of dorsal to lateral line. Dorsal XVI 10; last spine  $\frac{2}{7}$ , longest soft rays less than  $\frac{1}{2}$  length of head. Anal III 10; third spine stronger than dorsals,  $\frac{1}{4}$  head. Pectoral  $\frac{2}{3}$  head, not quite reaching anal. Caudal very slightly emarginate. Caudal peduncle  $1\frac{1}{2}$  as long as deep. A series of about 8 dark spots on each side of back; a second series below lateral line, posteriorly confluent to form a band.

A single specimen, 260 mm. in total length (*Wood*).

11. *LETHRINOPS*, gen. n.

(type *Chromis lethrinus* Günth.).

Differs from *Haplochromis* in the dentition. Teeth very small and slender, in a few series, forming narrow bands which are interrupted at the symphyses; outer teeth mostly bicuspid, often unicuspid posteriorly, inner uni- or tri-cuspid.

Nyassa: four species.

*Synopsis of the Species.*

## I. Pharyngeal teeth all small.

Snout shorter than postorbital part of head; maxillary not far short of vertical from anterior edge of eye .....	1. <i>albus</i> .
Snout longer than postorbital part of head; maxillary ending not far behind nostril .....	2. <i>macrorhynchus</i> .

## II. Last few teeth of two middle series of lower pharyngeal somewhat enlarged.

10 gill-rakers on lower part of anterior arch .....	3. <i>lethrinus</i> .
12-13 gill-rakers on lower part of anterior arch .....	4. <i>leptodon</i> .

1. *LETHRINOPS ALBUS*, sp. n.

*Tilapia macrophthalmia* (part.) Bouleng. Cat. Afr. Fish. iii. p. 261.

Depth of body equal to length of head, 3 in length of fish. Snout with straight profile, as long as diameter of eye, which is  $3\frac{1}{4}$  in length of head, interorbital width 5, depth of præorbital  $4\frac{1}{3}$ . Jaws equal; maxillary not far short of vertical from anterior edge of eye; teeth in 2 series. 3 series of scales on cheek. 10 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 32 scales in a longitudinal series, 5 from

origin of dorsal to lateral line. Dorsal XVI 10. Anal III 9; third spine  $\frac{2}{3}$  length of head, a little shorter than last dorsal. Pectoral as long as head, extending beyond origin of anal. Caudal scaly, emarginate. Caudal peduncle as long as deep. Silvery; an opercular spot.

A single specimen, 100 mm. in total length (*Whyte*).

## 2. *LETHRINOPS MACRORHYNCHUS*, sp. n.

*Tilapia lethrinus* (part.) Bouleng. Cat. Afr. Fish. iii. p. 254.

Depth of body  $2\frac{1}{2}$  in length, length of head  $2\frac{3}{4}$ . Snout with straight profile, longer than postorbital part of head. Interorbital region flat. Diameter of eye  $4\frac{1}{2}$  in length of head, interorbital width  $4\frac{1}{2}$ , depth of præorbital 3. Lower jaw projecting; maxillary ending not far behind nostril; teeth in 3 series. 3 series of scales on cheek. 10 gill-rakers on lower part of anterior arch. Pharyngeal teeth small. 33 scales in a longitudinal series, 5 from origin of dorsal to lateral line. Dorsal XVI 11; last spine  $\frac{1}{3}$  length of head. Anal III 9; third spine less than  $\frac{1}{3}$  head. Pectoral as long as head, extending nearly to middle of anal. Caudal scaly, emarginate. Caudal peduncle  $1\frac{1}{3}$  as long as deep. A blackish band from nape along upper lateral line to base of caudal.

A single specimen, 180 mm. long (*Whyte*).

## 3. *LETHRINOPS LETHRINUS* Günth., 1893.

*Tilapia lethrinus* (part.) Bouleng. Cat. Afr. Fish. iii. p. 254, fig. 171.

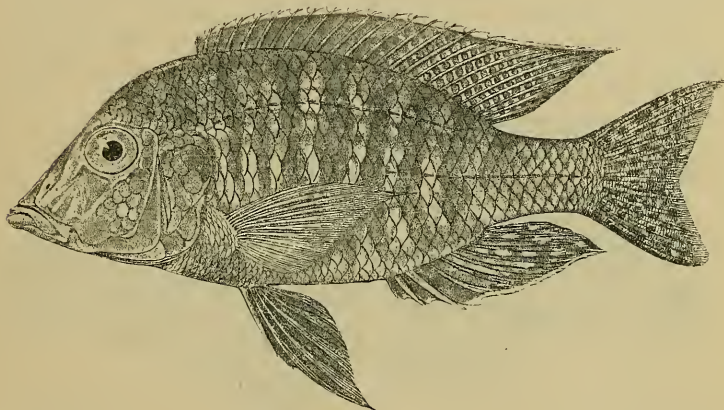
Depth of body  $2\frac{1}{2}$  to  $2\frac{3}{5}$  in length, length of head  $2\frac{3}{4}$  to 3. Snout with straight profile, as long as postorbital part of head. Interorbital region flat. Diameter of eye  $3\frac{3}{4}$  to  $4\frac{1}{4}$  in length of head, interorbital width 4, præorbital depth 3 to  $3\frac{1}{3}$ . Lower jaw slightly projecting; maxillary extending to between nostril and eye; teeth in 3 to 5 series. 3 or 4 series of scales on cheek. 10 gill-rakers on lower part of anterior arch. Lower pharyngeal with the last few teeth of the two middle series a little enlarged. 32 to 34 scales in a longitudinal series, 5 or 6 from origin of dorsal to lateral line. Dorsal XV–XVI 11; last spine from less than  $\frac{1}{2}$  to  $\frac{2}{5}$  length of head. Anal III 9; third spine  $\frac{1}{3}$  to  $\frac{2}{5}$  head. Pectoral a little shorter than head, reaching origin of anal. Caudal densely scaled, emarginate. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  as long as deep. A blackish lateral stripe running backwards above lower lateral line; sometimes a second above lateral line and a third near edge of back, or these may be represented by series of spots; dorsal spotted.

Three specimens, 140 to 200 mm. long (*Johnston, Moore*).

4. *LETHRINOPS LEPTODON*, sp. n. (Text-fig. 29.)

Depth of body  $2\frac{2}{5}$  to 3 in length, length of head  $2\frac{1}{5}$  to  $3\frac{1}{5}$ . Snout with steep, straight or slightly convex profile, as long as or a little shorter than postorbital part of head. Interorbital region convex. Diameter of eye  $3\frac{1}{2}$  to 4 in length of head, interorbital width  $3\frac{4}{5}$  to 5, depth of preorbital 3 to  $3\frac{1}{2}$ . Lower jaw slightly projecting; maxillary not extending to below eye; teeth in 3 or 4 series. 3 or 4 series of scales on cheek. 12 or 13 gill-rakers on lower part of anterior arch. Lower pharyngeal with the last few teeth of the two middle series a little enlarged. 31 to 34 scales in a longitudinal series, 5 or 6 from origin of dorsal to lateral line. Dorsal XV-XVI 10-13; last spine  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Anal III 9-10; third spine  $\frac{1}{3}$  to  $\frac{2}{5}$  head. Pectoral nearly

Text-figure 29.

*Lethrinops leptodon*.  $\frac{3}{7}$ .

as long as head, reaching anal. Caudal scaly, emarginate. Caudal peduncle  $1\frac{1}{4}$  to  $1\frac{1}{2}$  as long as deep. Silvery or bluish, with faint dark cross-bars; an opercular spot; an oblong dark blotch on lateral line below spinous dorsal, from just below which a dark band runs backwards to the caudal; dorsal and caudal with series of orange spots; dorsal sometimes with a yellow edge; anal with several ocelli in males.

Eight specimens, 140 to 180 mm. in total length (*Wood*).

12. *DOCIMODUS* Bouleng., 1896.

Differs from *Haplochromis* in the dentition. Teeth compressed, uni- or tri-cuspid, in 4 or 5 well-separated series; outer teeth large, forming a close-set series of about 20 in each jaw.

Nyassa; a single species.

*DOCIMODUS JOHNSTONI* Bouleng., 1896.

*Docimodus johnstonii* Bouleng. Cat. Afr. Fish. iii. p. 282, fig. 192.

Depth of body  $2\frac{3}{4}$  to 3 in length, length of head 3 to  $3\frac{1}{4}$ . Snout convex,  $1\frac{1}{4}$  to  $1\frac{1}{2}$  diameter of eye, which is equal to or greater than depth of præorbital, 4 to  $4\frac{1}{2}$  in length of head, interorbital width 3 to  $3\frac{1}{2}$ . Jaws strong; lower projecting; maxillary not extending to below eye. 3 or 4 series of scales on cheek. 10 or 11 gill-rakers on lower part of anterior arch. Pharyngeal teeth small, compressed, bicuspid. 34 to 36 scales in a longitudinal series, 5 from origin of dorsal to lateral line. Dorsal XVI-XVII 9-11; last spine  $\frac{1}{3}$  to  $\frac{2}{5}$  length of head. Anal III 9-10; third spine as long as or a little shorter than dorsal. Pectoral as long as head, reaching anal. Caudal scaly, truncate, with slight median notch. Caudal peduncle  $1\frac{1}{2}$  to  $1\frac{3}{4}$  as long as deep. A dark lateral band from shoulder to base of caudal; a series of dark spots at base of dorsal; an opercular spot; dorsal with series of spots, in male with a dark intra-marginal stripe and pale edge; anal and caudal, in the male, dusky with pale edge.

Four specimens, 160 to 250 mm. long (*Johnston, Wood*).

### 13. CYRTOCARA Boulenger, 1902

(type *C. moorii* Bouleng.).

Differs from *Haplochromis* in the structure of the spinous dorsal fin, which has the edge of the membrane straight between the tips of the spines. Teeth in several series, the outer enlarged, conical, or some bicuspid.

Nyassa.

#### *Synopsis of the Species.*

Jaws equal; caudal truncate or slightly emarginate .....	1. <i>venusta</i> .
Jaws equal; caudal crescentically emarginate.....	2. <i>annectens</i> .
Lower jaw projecting .....	3. <i>moorii</i> .

### 1. CYRTOCARA VENUSTA.

*Haplochromis venustus* Bouleng. Cat. Afr. Fish. iii. p. 287, fig. 195.

Depth of body  $2\frac{1}{2}$  to  $2\frac{3}{4}$  in length, length of head 3 to  $3\frac{1}{4}$ . Snout with straight profile, as long as postorbital part of head. Diameter of eye  $4\frac{1}{2}$  to 5 in length of head, equal to or a little less than præorbital depth; interorbital width  $3\frac{1}{2}$  to 4 in length of head. Jaws equal anteriorly; maxillary not extending to below eye; teeth conical, or some of the outer bicuspid, in 4 or 5 series, outer larger. 3 or 4 series of scales on cheek. 11 or 12 gill-rakers on lower part of anterior arch. 32 to 34 scales in a longitudinal series, 6 or 7 from origin of dorsal to lateral line. Dorsal XV-XVI 10-11; last spine  $\frac{2}{5}$  length of head. Anal III 10; third spine  $\frac{1}{3}$  head. Pectoral as long as head,



about reaching anal. Caudal scaly, truncate or slightly emarginate. Caudal peduncle  $1\frac{1}{5}$  to  $1\frac{1}{3}$  as long as deep. Bluish, with large vertically expanded blue-black spots tending to form irregular cross-bars; dorsal and anal with broad orange margin.

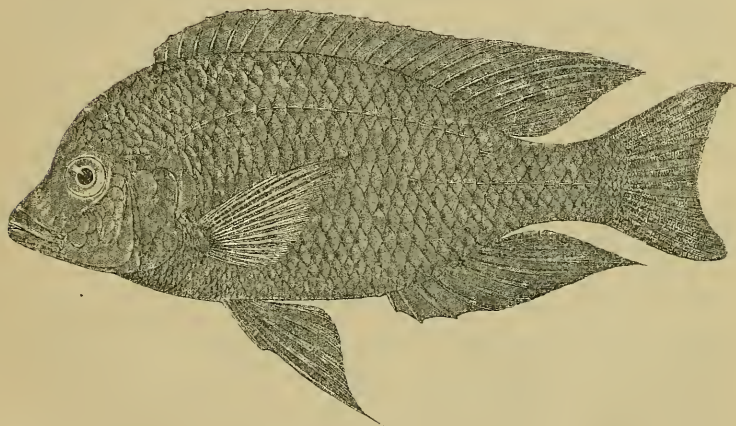
Four specimens, 170 to 200 mm. long (*Rhoades*).

Boulenger's figure shows a slight indication of lappets, but where the dorsal membrane is not torn its margin runs evenly between the tips of the spines.

## 2. CYRTOCARA ANNECTENS, sp. n. (Text-fig. 30.)

Depth of body  $2\frac{1}{3}$  to  $2\frac{2}{5}$  in length, length of head  $3\frac{2}{5}$  to  $3\frac{1}{2}$ . Occiput convex, snout straight or slightly concave, a little shorter than postorbital part of head. Diameter of eye 4 to  $4\frac{1}{2}$  in length of head, equal to præorbital depth; interorbital width  $3\frac{1}{3}$  in length of head. Jaws equal anteriorly; maxillary not quite reaching to below eye; teeth conical, in 3 or 4 series, outer

Text-figure 30.



*Cyrtocara annectens*.  $\frac{2}{3}$ .

larger. 2 or 3 series of scales on cheek. 12 or 13 gill-rakers on lower part of anterior arch. 34 to 36 scales in a longitudinal series, 5 or 6 from origin of dorsal to lateral line. Dorsal XVI-XVII 11-12; last spine  $\frac{2}{5}$  head. Anal III 8-9; third spine stronger and shorter than last dorsal. Pectoral as long as or a little longer than head, reaching anal. Caudal densely scaled, crescentically emarginate. Caudal peduncle  $1\frac{1}{3}$  to  $1\frac{1}{2}$  as long as deep. Uniformly bluish black.

Three specimens, 175 to 195 mm. in total length.

This species connects *C. venusta* with *C. moorii*, having the mouth formed as in the former, but in most other characters more nearly agreeing with the latter.

## 3. CYRTOCARA MOORII.

Very near the preceding species, but lower jaw projecting, some of the outer teeth pointing outwards, and maxillary extending to below eye. Occiput very convex. 3 or 4 series of scales on cheek. 11 gill-rakers on lower part of anterior arch. Dorsal XV-XVI 11. Anal III-IV 8-9.

## 14. RHAMPHOCHROMIS, gen. n.\*

(type *Hemichromis longiceps* Günth.).

Form elongate. Snout produced, nearly or quite  $\frac{1}{2}$  length of head. Mouth with lateral cleft, ending far in front of eye; præmaxillaries with an anterior beak-like expansion; lower jaw deep; teeth conical, acute, biserial, or sometimes a third series anteriorly in upper jaw; teeth of outer series strong or moderately strong, set well apart; anterior teeth of second series in upper jaw enlarged. 16 to 18 gill-rakers on lower part of anterior arch. Scales 36 to 44. Dorsal XVI-XX 11-13; spines slender, rather short; soft fin rounded. Anal III 9-11; third spine about as long as and stronger than last dorsal. Pectoral rather short. Caudal scaly, emarginate.

Nyassa.

*Synopsis of the Species.*

- I. Scales 36 to 40. Depth 4 to  $4\frac{3}{4}$  in length. Depth of caudal peduncle not less than half its length.
- A. Interorbital width about 4 in head, diameter of eye  $5\frac{1}{2}$  to 6 (in specimens of 200 to 240 mm.); 3 or 4 series of scales on cheek.
- Teeth moderate, 20 to 25 in outer series on each side ..... 1. *longiceps*.  
 Teeth strong, 10 to 15 in outer series on each side ..... 2. *ferox*.
- B. Interorbital width about 5 in head; teeth strong.
- Diameter of eye 5 in head (in specimens of 200 to 230 mm.);  
 3 or 4 series of scales on cheek ..... 3. *macrophthalmus*.  
 Diameter of eye 6 to 8 in head (in specimens of 160 to  
 330 mm.); 5 or 6 series of scales on cheek ..... 4. *woodi*.
- II. Scales 43 or 44. Depth  $4\frac{3}{4}$  to  $5\frac{1}{2}$  in length.
- Caudal peduncle  $2\frac{1}{4}$  as long as deep; snout convex ..... 5. *esox*.  
 Caudal peduncle  $2\frac{3}{4}$  as long as deep; snout straight ..... 6. *leptosoma*.

## 1. RHAMPHOCHROMIS LONGICEPS.

*Hemichromis longiceps* (part.) Günth. P. Z. S. 1864, p. 313.

*Champsochromis longiceps* (part.) Bouleng. Cat. Afr. Fish. iii. p. 434 (1915).

Depth of body 4 in length, length of head  $2\frac{1}{2}$ . Diameter of eye  $2\frac{1}{2}$  in length of snout,  $5\frac{1}{2}$  in length of head; interorbital width 4 in length of head. Jaws meeting anteriorly; chin prominent; teeth moderate, 20 to 25 on each side in upper jaw. 4 series of scales on cheek. 36 to 38 scales in a longitudinal

\* In the 'Zoological Record' for 1916, I named *C. cæruleus* as the type of *Champsochromis*; consequently a new name has to be found for the other species included in *Champsochromis* by Boulenger.

series, 5 or 6 from origin of dorsal to lateral line. Dorsal XVII-XVIII 11-12; last spine  $\frac{1}{4}$  length of head. Anal III 9. Pectoral  $\frac{1}{2}$  length of head. Caudal peduncle  $1\frac{2}{3}$  as long as deep. Silvery; back darker; an opercular spot.

Description mainly based on a specimen 240 mm. long (*Moore*), which has been compared with one of the types, a skin of 220 mm. A skeleton has 36 (18+18) vertebrae.

## 2. RHAMPHOCHROMIS FEROX, sp. n.

? *Hemichromis longiceps* (part.) Günth. P. Z. S. 1864, p. 313.

*Champsochromis longiceps* (part.) Bouleng. Cat. Afr. Fish. iii. p. 434 (1915).

Depth of body 4 in length, length of head 3. Snout a little less than  $\frac{1}{2}$  length of head. Diameter of eye 6 in length of head, interorbital width  $4\frac{1}{4}$ . Jaws meeting anteriorly; chin prominent; teeth strong, 10 to 15 on each side of upper jaw. 3 or 4 series of scales on cheek. 38 or 39 scales in a longitudinal series, 5 or 6 from origin of dorsal to lateral line. Dorsal XVII 12; last spine  $\frac{1}{4}$  length of head. Anal III 10. Pectoral  $\frac{1}{2}$  length of head. Caudal peduncle twice as long as deep. Silvery; back darker; an opercular spot.

Two spirit-specimens (*Moore, Rendall*), 200 and 240 mm. in total length. Günther's second type-specimen of *H. longiceps* probably belongs to this species.

## 3. RHAMPHOCHROMIS MACROPHthalmus, sp. n. (Pl. VI. fig. 2.)

Depth of body 4 to  $4\frac{1}{3}$  in length, length of head  $2\frac{5}{8}$ . Diameter of eye  $2\frac{1}{4}$  in length of snout, 5 in length of head, equal to interorbital width. 3 or 4 series of scales on cheek. 38 to 40 scales in a longitudinal series, 5 to 7 from first dorsal spine to lateral line. Dorsal XVIII-XIX 11-12; last spine  $\frac{1}{4}$  length of head. Anal III 10. Pectoral  $\frac{3}{5}$  length of head. Caudal peduncle twice as long as deep. Silvery; back darker; a blackish opercular spot; dorsal and caudal greyish, pelvics and anal orange.

Three examples, 200 to 230 mm. in total length (*Wood*).

## 4. RHAMPHOCHROMIS WOODI, sp. n.

*Champsochromis longiceps* (part.) Bouleng. Cat. Afr. Fish. iii. p. 434, fig. 296 (1915).

Depth of body 4 to  $4\frac{2}{3}$  in length, length of head  $2\frac{2}{3}$  to  $2\frac{3}{4}$ . Snout  $\frac{1}{2}$  length of head. Diameter of eye 6 to 8 in length of head, interorbital width  $4\frac{3}{4}$  to 5. Lower jaw projecting. 5 or 6 series of scales on cheek. 38 to 40 scales in a longitudinal series, 6 or 7 from origin of dorsal to lateral line. Dorsal XVII-XIX 11-12; last spine  $\frac{1}{5}$  to  $\frac{1}{4}$  length of head. Anal III 10-11. Pectoral  $\frac{3}{5}$  or a little less than  $\frac{3}{5}$  length of head. Caudal peduncle

$1\frac{2}{3}$  to 2 as long as deep. Silvery, back darker; an opercular spot; soft dorsal and caudal spotted.

Four specimens, the one figured by Boulenger, 330 mm. long (*Rhoades*), and three of 160 to 215 mm. (*Wood*). A skeleton has 38 (18+20) vertebrae.

##### 5. RHAMPHOCHROMIS ESOX.

*Paratilapia esox* (part.) Boulenger, Ann. & Mag. N. H. (8) ii. 1908, p. 240.

*Champsochromis longiceps* (part.) Boulenger, Cat. Afr. Fish. iii. p. 434 (1915).

*Champsochromis esox* (part.) Boulenger, t. c. p. 435, fig. 297.

Depth of body  $4\frac{3}{4}$  in length, length of head 3. Snout with convex upper profile,  $\frac{1}{2}$  length of head. Diameter of eye  $7\frac{1}{2}$  to  $8\frac{1}{2}$  in length of head, interorbital width  $3\frac{3}{4}$ . Lower jaw projecting; only the inner edge of premaxillary sheathed by preorbital. 5 or 6 series of scales on cheek. 43 or 44 scales in a longitudinal series, 7 or 8 from origin of dorsal to lateral line. Dorsal XVIII-XX 12; last spine  $\frac{1}{5}$  length of head. Anal III 10. Pectoral  $\frac{1}{2}$  length of head. Caudal peduncle  $2\frac{1}{4}$  as long as deep. Silvery; back darker; an opercular spot and a lateral band.

Two spirit-specimens, one of 370 mm. the type figured by Boulenger, the other 330 mm. long (*Moore*), and a skeleton with 39 (19+20) vertebrae.

##### 6. RHAMPHOCHROMIS LEPTOSOMA, sp. n.

*Paratilapia esox* (part.) Bouleng. Ann. & Mag. N. H. (8) ii. 1908, p. 240.

*Champsochromis esox* (part.) Bouleng. Cat. Afr. Fish. iii. p. 435 (1915).

Depth of body  $5\frac{1}{3}$  in length, length of head 3. Snout  $\frac{1}{2}$  length of head, with straight upper profile; diameter of eye  $7\frac{1}{2}$  in length of head, interorbital width 4. Distal half of premaxillary sheathed by preorbital for nearly its whole width; jaws meeting anteriorly, but chin prominent. 6 series of scales on cheek. 43 scales in a longitudinal series, 7 from origin of dorsal to lateral line. Dorsal XIX 13; last spine  $\frac{1}{5}$  length of head. Caudal peduncle  $2\frac{3}{4}$  as long as deep. Silvery; back darker; a dark opercular spot and a lateral band.

A single specimen, one of the types of *P. esox*, 380 mm. in total length.

##### 15. AULONOCARA, gen. n.

Frontal, nasal, orbital, preopercular, and mandibular bones with large channels with wide openings as *Trematocara*, from which *Aulonocara* may be distinguished externally by the bicuspid outer teeth, the more numerous dorsal spines, and the presence of two lateral lines.



AULONOCARA NYASSÆ, sp. n. (Pl. V. fig. 1.)

Depth of body  $2\frac{1}{2}$  to 3 in length. length of head  $2\frac{3}{4}$  to 3. Snout with straight or slightly convex profile, as long as post-orbital part of head. Diameter of eye  $3\frac{1}{3}$  to  $3\frac{2}{3}$  in length of head, equal to or greater than præorbital depth, greater than inter-orbital width. Jaws equal anteriorly; maxillary concealed, not extending to below eye; teeth small and slender, in 4 or 5 series, outer bicuspid, scarcely larger than inner. 9 or 10 gill-rakers on lower part of anterior arch. Pharyngeal teeth small, slender, bicuspid. 31 or 32 scales in a longitudinal series, 5 or 6 from origin of dorsal to lateral line. Dorsal XV-XVI 10-11; last spine  $\frac{2}{5}$  to  $\frac{1}{2}$  length of head. Anal III 9; third spine stronger and as long as or a little shorter than last dorsal. Pectoral as long as head, reaching anal. Caudal scaly, emarginate. Caudal peduncle longer than deep. Silvery; an opercular spot; about 10 faint dark cross-bars; dorsal with series of orange spots; lower fins orange (♀) or blackish, the anal with orange spots (♂).

Three specimens, 100-125 mm. long (Wood).

#### EXPLANATION OF THE PLATES.

PLATE I.	<i>Haplochromis polystigma.</i>
PLATE II.	„ <i>woodi.</i>
PLATE III.	„ <i>præorbitalis.</i>
PLATE IV. fig. 1.	„ <i>eucinostomus.</i>
fig. 2.	„ <i>macrostoma.</i>
PLATE V. fig. 1.	<i>Aulonocara nyassæ.</i>
fig. 2.	<i>Haplochromis longipes.</i>
PLATE VI. fig. 1.	<i>Rhamphochromis macrophthalmus.</i>
fig. 2.	<i>Haplochromis spilorhynchus.</i>